

# STATE OF MICHIGAN INVESTMENT BOARD MEETING

## December 19, 2019

State of Michigan Retirement System  
Quarterly Investment Review



Rachael Eubanks, State Treasurer  
Prepared by Bureau of Investments  
Michigan Department of Treasury

# STATE OF MICHIGAN INVESTMENT BOARD MEETING

DECEMBER 19, 2019

## Agenda



- 9:30 a.m. Call to Order and Opening Remarks
- 9:40 a.m. Approval of the 9/12/19 SMIB Meeting Minutes
- 9:45 a.m. Executive Summary & Performance for Periods Ending 9/30/19
- 10:00 a.m. Current Asset Allocation Review
- Markets Review and Outlook
- 10:15 a.m. Review of Investment Reports
- Private Equity
  - Real Estate & Infrastructure
  - Real & Opportunistic Return
  - Absolute Return
  - Fixed Income
  - Domestic Equity – *Receive and File*
  - International Equity – *Receive and File*
  - Defined Contribution – *Receive and File*
- Basket Clause – *Receive and File*
- 11:00 a.m. Public Comment
- Closing Remarks ~ Adjournment



### 2020 Meeting Schedule

Thursday, March 19, 2020  
Thursday, June 11, 2020  
Thursday, September 10, 2020  
Thursday, December 10, 2020

All meetings start at 9:30 a.m.

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# State of Michigan Retirement System

## MINUTES

State of Michigan Investment Board Meeting

December 19, 2019



Jon M. Braeutigam  
Chief Investment Officer  
Bureau of Investments

# **STATE OF MICHIGAN INVESTMENT BOARD**

## **September 12, 2019 Meeting Minutes**

### **Members Present:**

Chairman – Treasurer Rachael Eubanks  
Ms. Dina Richard  
Mr. Reginald Sanders  
Mr. James Nicholson

### **Members of the Public and Bureau of Investments Staff Present:**

Molly Jason	Karen Stout	Jack Behar
Karl Borgquist	Nick Whitman	Janet Sudac
Mary Pollock	Anthony Estell	Kerrie VandenBosch
John Richards	Todd Warstler	Travis Haney
Bradley Hartwell	Semone James	Mark Porrell
Ann Stange	Patrick Moraniec	Robert Brackenbury
Lan Chen	Ann Storberg	Jennifer Yeung
Aaron Bandy	Jon Braeutigam	Tom Smith
Peter Woodford	Woody Tyler	Chuck Abshagen
Greg Parker	Giles Feldpausch	Ron Rolighed
Lori Barrett	Annette Russell	Max Kotary
Kevin Fedewa	Tim McEnery	Steve Cummings
Janet Sudac	Navneet Adhi	Royce Humm

### **Opening Remarks:**

Rachael Eubanks called the meeting to order at 9:32 am.

### **Approval of Minutes:**

Approval of the June 6 2019, SMIB Meeting Minutes – Motion to approve: James Nicholson. Seconded: Dina Richard. The vote was unanimous to approve.

## **AGENDA**

### **Executive Summary and Performance**

Jon Braeutigam, Chief Investment Officer for the Bureau of Investments, reviewed the executive summary performance section stating that the 1-year return was 8%, 3-year return was 11%, 5-year return was 8.1%, 7-year return was 10.2% and the 10-year return was 10.5%. All of these are above the actuarial required rate of return of 6.8%. Compared to the peer median return, this equates to \$12 billion in extra value over the past 10 years. Translating that into the impact on the State's budget, it is estimated to be somewhere between \$700 to \$800 million (above peer returns) in additional annual income that accrues to the benefit of the State's General and School Aid Funds.

Mr. Braeutigam stated that interest rates are generally very low across the entire world, and the US Treasury is well below 2%, which is significantly lower than a year ago.

When asked about his view on pension obligation bonds (POBs), Mr. Braeutigam explained he believes that it would add risk to the State as it levers the pension fund. He explained

that in his opinion any potential benefits derived would come much later, in about 20-30 years. He spoke about the magnitude of the dollar of POBs being discussed and how difficult it would be for the BOI to put the money to work with the same or similar asset allocation as currently exists in a timely fashion. Additionally, any recession would have a negative effect on the State's balance sheet.

### **Asset Allocation Review, Markets Review and Outlook**

Gregory Parker, Director of Investments - Public Markets reviewed the yield curve. He believes that the already low Federal Reserve Policy Rate is likely to be set lower in October and discussed the increased odds for a recession.

On asset allocation review, Mr. Parker stated that the Plan is slightly defensively positioned; underweight in domestic equity by -5.5%; overweight in fixed income by 2.5% and overweight in cash by 3.0%. Mr. Parker was asked about liquidity and liquidity planning and about small cap weighting.

### **Domestic Equity Review**

Jack Behar, Senior Investment Manager of the division reviewed domestic equity performance. He acknowledged two of his staff members and the very good performance of the funds they oversee. Mr. Behar reviewed the division's return outlook.

### **Venture Capital Review**

Travis Haney, Senior Investment Manager, reviewed the venture capital portfolio and how it is allocated. He highlighted some of the manager relationships and answered a series of questions from the Board regarding venture capital.

### **Guest Speaker**

Cathie Wood, CEO of ARK Investment Management LLC, discussed her firm's viewpoints regarding economic opportunities. ARK believes that disruptive innovation is key to growth. Ms. Wood spoke on Lithium-ion battery costs, vehicles going to electric drivetrains, the future of autonomous taxi networks and next generation DNA sequencing.

### **Review of Investment Reports – Received and Filed**

### **Public Comment**

Treasurer Eubanks asked that any attendees wishing to address the Board come forward. No public comment.

### **Adjournment**

Treasurer Eubanks adjourned the meeting at 11:15 am. Motion to adjourn by James Nicholson. Seconded: Reggie Sanders. The vote was unanimous to adjourn.

Approved:

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Rachael Eubanks, Chairman

State of Michigan Retirement System

# EXECUTIVE SUMMARY

State of Michigan Investment Board Meeting

December 19, 2019



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

# EXECUTIVE SUMMARY

## September 2019

### **Performance**

*Great peer comparison.*

<b>MPSERS Plan (09/30/19)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Annualized Returns	5.6%	10.3%	8.1%	9.8%	9.7%
Policy Returns	6.6%	10.1%	8.4%	9.8%	9.9%
Peer Median Returns*	5.2%	8.3%	7.0%	8.1%	8.6%

\*State Street Universe greater than \$10 billion.

- Over the past one, three, five, seven, and ten years, the returns are significantly higher than peer median returns. Compared to the State Street Universe of public pension plans greater than \$10 billion, the returns are mostly near the top decile of returns. Also, the plans' returns were among the least risky, as measured by standard deviation.
- The ten-year return begins at the cyclical low of the global financial crisis and because risk assets were trading at depressed prices, the trailing 10-year returns are above average. Over a very long horizon, since 1979, the annualized rate of return on the plan assets has been approximately 9.4%.
- Compounding at higher than peer returns can add significant value. For example, based on the \$46.5 billion September 2009 market value, a ten-year annualized return of 9.7% compared to the 8.6% peer median return would add about \$11.25 billion in excess value.
- The returns were generally in-line with the policy benchmark.
- For the year ending September 2019, returns exceeded the peer median return by 0.4%. Most of the individual asset class returns were better than median, and private equity returns were in the top quartile of returns for its respective asset class.

### **Asset Allocation**

*A low return environment.*

- Given the low rates of return available in the capital markets for safe assets, and in order to earn the actuarial rates of returns, additional risks (primarily equity risk) must be assumed. However, at the end of September 2019, the equity risk (beta) is approximately 0.4 which is the lowest measurement in three decades, and it is lower than peer median at approximately 0.6.
- Liquidity is another fundamental risk assumed and it is managed through asset allocation. The plans have outstanding capital commitments to fund approximately \$13.4 billion in illiquid assets, primarily in private equity. In the September 2019 quarter, \$1.1 billion of new commitments were made.
- The combined systems paid out approximately \$2.04 billion net of contributions over the past twelve months ending in September 2019. Over the past year, private equity was a net purchaser of approximately \$680 million, real return & opportunistic of \$672 million, and fixed income allocation increased by \$423 million. Over the past year, the allocation to domestic equity was reduced by \$2.77 billion, real estate decreased by \$1.06 billion, international equity by \$500 million and absolute return by \$338 million. The allocation to short-term cash increased by approximately \$853 million.

## **Economy and Capital Markets**

*Potentially slowing economy.*

- The most recent reading of the annualized U.S. GDP growth was 1.9%, ahead of the consensus estimate of 1.6%. Current estimates for 2020 GDP growth for the U.S. are around 1.8%, however, there are increasingly more concerns regarding lower than forecasted growth.
- The JPMorgan Global Manufacturing Purchasing Manager Index (PMI) peaked in December 2017 and has been steadily declining since. In July 2019, the index fell to its lowest mark in over six years and it has been under 50 (deteriorating economic conditions) for six months in a row.
- The Federal Reserve Bank of New York recession probability index currently estimates the chance of a recession occurring in the U.S. in the next 12 months to be around 30% after peaking earlier in the year near 40%. Important for consideration with this index, the measure has never hit 100% certainty even during a recession. In the last three recessions, the measure failed to hit over 50%, and in the last 50 years every measure of at least 30% has been associated with a recession.
- The interest rate curve inversion that lasted through the summer of 2019 reverted to a positive slope by mid-October. An inverted yield curve is often cited as a warning indicator of an impending economic recession; however, a reversion of rates normally does not invalidate the power of the signal. In this instance, the market seems to be signaling it is content with the Fed's interest rate policy position now, compared to the Fed's stance late last year.
- The past decade, coming out from the Global Financial Crisis, has been characterized as a risk-on market; however, many traditional risk premia have not performed as expected. For example; U.S. small cap stocks have lagged large caps, value styles have lagged growth styles, foreign equities have lagged U.S. equities and within foreign markets, emerging markets have lagged developed.

## **Defined Contribution**

*A summary.*

- At the end of September 2019, the Defined Contribution assets were \$8.9 billion, up from \$8.6 billion the year prior. Index fund strategies represent 41.9% and actively managed funds represent 34.7% of the assets. The default Target Date Funds are 21.3% and the Self-Managed Account is 2.1% of the assets.
- TD Ameritrade (Tier III self-managed brokerage account) announced in October 2019 that they were moving to commission-free online trading of equity securities.
- State Street Global Advisors recently conducted an ecosystem study of the MPSERS and SERS Defined Contribution assets. Below is a summary of the findings:
  - Contribution rates of ~ 9.8% are healthy and above industry average.
  - Plan assets are concentrated with older participants in the SERS plan who are primarily invested in core funds with large equity exposure.
  - MPSERS has more participants and they tend to be younger and relatively new to the plan.
  - There are meaningful differences in asset allocations between participants in the two plans: MPSERS participants are more likely to invest in the Target Date Funds while SERS participants are more likely to invest in equities.



**Investment Update***Highlighting the quarter.*

(\$ Millions)

**NEW COMMITMENTS****June 30, 2019 – September 30, 2019**

<b>Asset class</b>	<b>Fund Name / (Managed By)</b>	<b>Commitment</b>
<b>Private Equity</b>		
	Apax X USD, LP (Apax X GP Co. Limited)	\$150.0
	Veritas Capital Fund VII, LP (Veritas Capital Fund Management, LLC)	100.0
	Lightspeed Opportunity Fund, LP (Lightspeed Venture Partners)	25.0
	Science Ventures Fund III, LP (Science Partners Management, LLC)	25.0
	Riverside Micro-Cap Fund IV B, LP (RMCF IV Associates, LP)	15.0
<b>Real Estate and Infrastructure Division</b>		
	Invesco Strategic Opportunities III, LP (Invesco Advisers, Inc.)	100.0
	AEW Senior Housing Investors IV, LP (AEW Senior Housing Investors IV GP, LP)	50.0
<b>Real &amp; Opportunistic Division</b>		
	BSCH II, LP (Blackstone Strategic Capital Advisors, LLC)	250.0
	BSCH II Co-investment, LP (Blackstone Strategic Capital Advisors, LLC)	100.0
	AG Credit Solutions Fund, LP (Angelo, Gordon & Co. LP)	100.0
	Orion Mine Finance Fund III, LP (Orion Mine Finance Management III, LLC)	75.0
	Turning Rock Fund I, LP (Turning Rock Partners LP)	75.0
<b>Absolute Return Division</b>		
	No new commitments	0.0
<b>TOTAL</b>		<b>\$1,065.0</b>

State of Michigan Retirement System

# PERFORMANCE

State of Michigan Investment Board Meeting

December 19, 2019



Jon M. Braeutigam  
Chief Investment Officer  
Bureau of Investments

# ***Bureau of Investments***

## **Mission Statement**

*The Bureau of Investments continually strives to provide quality investment management services, broad professional expertise, and independent advice to the State of Michigan Investment Board as fiduciary of the State of Michigan Retirement System, and independent of the Board, to the State Treasurer for various Michigan trust funds and the State's common cash, for which the State Treasurer is the fiduciary.*

## **SMRS Goals**

*Maintain sufficient liquidity to pay benefits.*

*Meet or exceed the actuarial assumption  
over the long term.*

*Perform in the top half of the public plan  
universe over the long term.*

*Diversify assets to reduce risk.*

*Exceed individual asset class benchmarks  
over the long term.*

# MPERS PENSION

## Time-Weighted Rates of Return

### Periods Ending September 30, 2019

	% of Portfolio 9/30/19	Ten Years <sup>1</sup>		Seven Years <sup>1</sup>		Five Years <sup>1</sup>		Three Years <sup>1</sup>		One Year		Current Quarter	
		Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
<b>TOTAL PLAN</b>	<b>100.0</b>	9.7	10	9.8	5	8.1	9	10.3	5	5.6	43	1.4	33
Median - Greater than \$10 Billion <sup>2</sup>		8.6		8.1		7.0		8.3		5.2		1.2	
MPERS Total Plan Policy		9.9		9.8		8.4		10.1		6.6		1.7	
<b>DOMESTIC EQUITIES</b>	<b>22.5</b>	13.1	31	13.5	13	10.6	19	14.2	12	2.6	43	1.0	38
Median <sup>2</sup>		11.0		10.3		7.7		9.8		2.2		0.8	
S&P 1500 Index		13.2		13.1		10.7		13.0		3.4		1.5	
<b>PRIVATE EQUITY AND VENTURE CAPITAL</b>	<b>18.6</b>	15.4	13	14.5	11	12.3	13	15.6	11	11.2	14	3.7	8
Median <sup>2</sup>		10.3		10.0		8.5		9.6		7.2		2.3	
Private Equity and VC Benchmark <sup>3</sup>		18.1		17.4		14.0		17.6		13.7		5.1	
<b>INTERNATIONAL EQUITIES</b>	<b>16.0</b>	5.5	59	6.1	69	4.1	55	6.9	56	-1.1	66	-1.6	56
Median <sup>2</sup>		5.6		6.4		4.2		7.0		-0.9		-1.4	
International Blended Benchmark <sup>4</sup>		4.4		5.1		2.9		6.3		-1.2		-1.8	
<b>FIXED INCOME</b>	<b>13.6</b>	4.9	37	4.0	19	4.8	14	4.6	16	9.7	34	2.2	32
Median <sup>2</sup>		4.7		3.0		4.0		3.8		8.9		1.9	
Bardays Aggregate		3.8		2.7		3.4		2.9		10.3		2.3	
<b>REAL RETURN AND OPPORTUNISTIC</b>	<b>10.8</b>			11.4		9.9		12.4		10.5		0.7	
50% (CPI +500 bps) + 50% (6.8% actuarial rate)				7.1		7.1		7.3		6.5		1.5	
<b>REAL ESTATE &amp; INFRASTRUCTURE</b>	<b>9.5</b>	8.3	73	11.2	42	10.1	40	9.4	28	8.0	34	2.7	23
Median <sup>2</sup>		9.8		10.3		9.2		7.5		7.0		1.4	
NCREIF - Property Blended Index <sup>5</sup>		8.4		7.9		7.2		5.4		4.9		1.1	
NCREIF Open Fund Index Net		9.8		9.3		8.4		6.3		4.6		1.1	
<b>ABSOLUTE RETURN</b>	<b>5.5</b>	5.3		5.4		3.7		6.0		4.1		2.3	
HFRI FOF Cons 1 month lagged		2.9		3.3		2.1		3.3		1.6		0.7	
<b>CASH EQUIVALENTS</b>	<b>3.6</b>	0.9		1.1		1.4		1.9		2.7		0.5	
1 Month T-Bill		0.5		0.7		0.9		1.5		2.3		0.5	

<sup>1</sup> Annualized Returns and Percentile Rank.

<sup>2</sup> Comparison universe is the State Street Universe comprised of Public Funds greater than \$10 billion on the total plan level and greater than \$1 billion for asset classes.

<sup>3</sup> SP500 + 300 bps with a 3 month lag.

<sup>4</sup> International blended benchmark is S&P Developed BMI-EPAC 50/50 prior to 1/1/10. S&P Developed BMI-EPAC 75 USD / 25 Local, 1/1/10 to 9/30/10. MSCI ACWI ex USA Gross 10/1/10 to present.

<sup>5</sup> NCREIF - Property Blended Index is NPI minus 130 bps.

Source: State Street Analytics; the NCREIF - NPI (Property Index) source is NCREIF; the S&P BMI-EPAC Index source is S&P.

## Cumulative and Consecutive Total Fund Returns

MPERS											
Cumulative For Years Ending 9/30/19											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
<b>MPERS</b>	<b>5.6</b>	<b>8.5</b>	<b>10.3</b>	<b>9.6</b>	<b>8.1</b>	<b>9.4</b>	<b>9.8</b>	<b>10.2</b>	<b>9.8</b>	<b>9.7</b>	
Public Plan - Median (> \$10 billion)*	5.2	6.3	8.3	8.5	7.0	7.8	8.1	9.2	8.4	8.6	
Rank	43	6	5	13	9	5	5	10	5	10	
bp Difference - Median	40	224	199	104	114	160	169	103	143	117	
Consecutive For Years Ending											
	09/19	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	
<b>MPERS</b>	<b>5.6</b>	<b>11.6</b>	<b>13.8</b>	<b>7.6</b>	<b>2.6</b>	<b>15.6</b>	<b>12.5</b>	<b>13.4</b>	<b>6.6</b>	<b>8.8</b>	
Public Plan - Median (> \$10 billion)*	5.2	7.6	12.7	9.5	0.2	11.1	12.6	15.3	2.6	10.2	
Rank	43	5	23	91	5	4	51	77	8	84	
bp Difference - Median	40	391	113	-192	241	449	-4	-188	404	-140	

MSERS											
Cumulative For Years Ending 9/30/2019											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
<b>MSERS</b>	<b>5.6</b>	<b>8.5</b>	<b>10.3</b>	<b>9.6</b>	<b>8.2</b>	<b>9.3</b>	<b>9.8</b>	<b>10.2</b>	<b>9.8</b>	<b>9.7</b>	
Public Plan - Median (> \$1 billion)*	4.3	6.0	8.0	8.4	6.4	6.9	8.0	8.9	8.1	8.2	
Rank	29	4	3	12	7	4	4	11	6	9	
bp Difference - Median	124	254	222	120	173	244	182	138	171	146	
Consecutive For Years Ending											
	09/19	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	
<b>MSERS</b>	<b>5.6</b>	<b>11.5</b>	<b>13.8</b>	<b>7.6</b>	<b>2.6</b>	<b>15.5</b>	<b>12.5</b>	<b>13.4</b>	<b>6.5</b>	<b>8.5</b>	
Public Plan - Median (> \$1 billion)*	4.3	7.7	12.7	9.7	-0.3	10.4	12.8	15.8	2.1	10.2	
Rank	29	5	30	88	4	4	54	81	6	79	
bp Difference - Median	124	382	108	-203	287	516	-29	-239	432	-166	

\*State Street Public Funds Universe

## Cumulative and Consecutive Total Fund Returns

MSPRS											
Cumulative For Years Ending 9/30/19											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
<b>MSPRS</b>	<b>5.6</b>	<b>8.5</b>	<b>10.2</b>	<b>9.6</b>	<b>8.1</b>	<b>9.3</b>	<b>9.8</b>	<b>10.2</b>	<b>9.8</b>	<b>9.7</b>	
Public Plan - Median (> \$1 billion)*	4.3	6.0	8.0	8.4	6.4	6.9	8.0	8.9	8.1	8.2	
Rank	30	4	4	12	8	4	4	12	6	10	
bp Difference - Median	121	252	221	119	171	242	180	134	171	145	
Consecutive For Years Ending											
	09/19	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	
<b>MSPRS</b>	<b>5.6</b>	<b>11.5</b>	<b>13.8</b>	<b>7.6</b>	<b>2.5</b>	<b>15.5</b>	<b>12.4</b>	<b>13.3</b>	<b>6.7</b>	<b>8.5</b>	
Public Plan - Median (> \$1 billion)*	4.3	7.7	12.7	9.7	-0.3	10.4	12.8	15.8	2.1	10.2	
Rank	30	5	30	88	4	4	54	87	5	79	
bp Difference - Median	121	381	108	-204	286	508	-34	-252	458	-167	

MJRS											
Cumulative For Years Ending 9/30/19											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
<b>MJRS</b>	<b>5.6</b>	<b>8.5</b>	<b>10.3</b>	<b>9.6</b>	<b>8.1</b>	<b>9.2</b>	<b>9.6</b>	<b>10.2</b>	<b>9.7</b>	<b>9.4</b>	
Public Plan - Median (> \$1 billion)*	4.3	6.0	8.0	8.4	6.4	6.9	8.0	8.9	8.1	8.2	
Rank	29	4	3	12	7	4	5	13	9	18	
bp Difference - Median	122	251	223	121	172	234	168	132	161	121	
Consecutive For Years Ending											
	09/19	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	
<b>MJRS</b>	<b>5.6</b>	<b>11.5</b>	<b>13.9</b>	<b>7.6</b>	<b>2.5</b>	<b>14.9</b>	<b>12.1</b>	<b>13.9</b>	<b>6.1</b>	<b>7.0</b>	
Public Plan - Median (> \$1 billion)*	4.3	7.7	12.7	9.7	-0.3	10.4	12.8	15.8	2.1	10.2	
Rank	29	5	30	88	4	4	60	73	8	93	
bp Difference - Median	122	379	116	-203	284	451	-68	-186	393	-315	

\*State Street Public Funds Universe

State of Michigan Retirement System

# ASSET ALLOCATION REVIEW

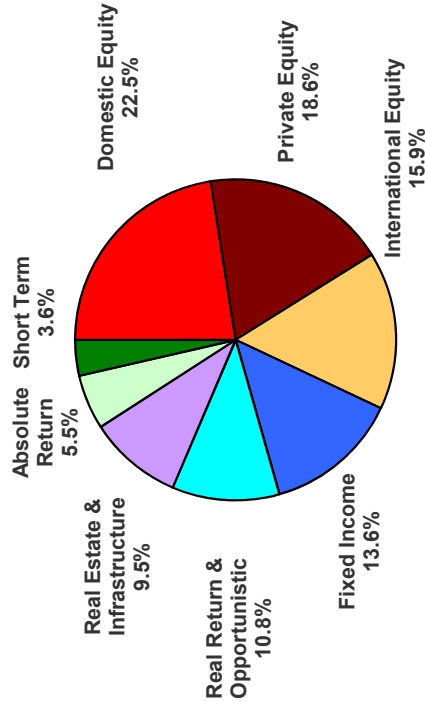
State of Michigan Investment Board Meeting  
December 19, 2019



Jon M. Braeutigam  
Chief Investment Officer  
Bureau of Investments

# STATE OF MICHIGAN RETIREMENT SYSTEM PROFILE - SEPTEMBER 2019

## Asset Allocation ~ 9/30/19



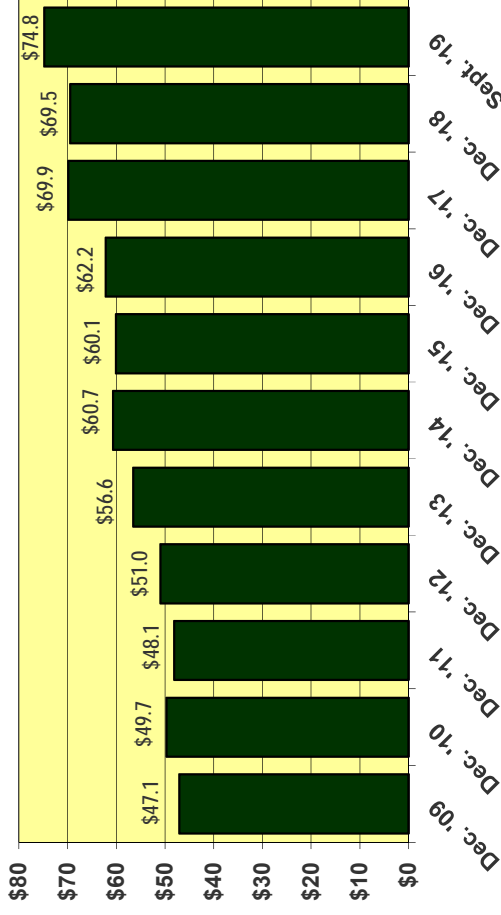
## Asset Allocation By Market Value (In Millions)

Investment Strategies	9/30/2019	9/30/2018
Domestic Equity	\$16,789	\$19,214
Private Equity	13,893	11,971
International Equity	11,929	12,558
Fixed Income	10,170	8,825
Real Return & Opport.	8,055	6,670
Real Estate & Infrastructure	7,113	7,688
Absolute Return	4,125	4,307
Short Term***	2,679	1,826
<b>TOTAL</b>	<b>\$74,753</b>	<b>\$73,059</b>
	<b>100.0%</b>	<b>100.0%</b>

## Short Term Equivalents (in Billions)

Short Term Strategy***	\$2.7
Short Term in Other Inv. Strategies	1.3
<b>TOTAL SHORT TERM</b>	<b>\$4.0</b>
	<b>5.4% of Total Funds</b>

## Market Value\* (Billions of Dollars)



## Market Value By Plan ~ 9/30/19 (in Millions)

	Pension Plan Mkt. Value	OPEB** Mkt. Value	Combined Mkt. Value	%
MPSERS	\$50,684	\$6,899	\$57,583	77.0%
MSERS - (closed)	12,249	2,927	15,176	20.3%
MSPRS	1,500	222	1,722	2.3%
MJRS - (closed)	263	9	272	0.4%
<b>TOTAL</b>	<b>\$64,696</b>	<b>\$10,057</b>	<b>\$74,753</b>	<b>100.0%</b>

MSERS includes the Military Pension Fund

18th Largest DB Public Pension Fund in the U.S.

Pensions & Investments Survey - February 4, 2019 Issue

\*The combined net payout for the plans for FY 2018 was \$1.7 billion with \$22.0 billion paid out FY 2009 thru FY 2018 (Pension CAFRs). This represents the amount paid to beneficiaries in excess of employer and employee contributions.  
\*\*OPEB - Other Post Employment Benefits



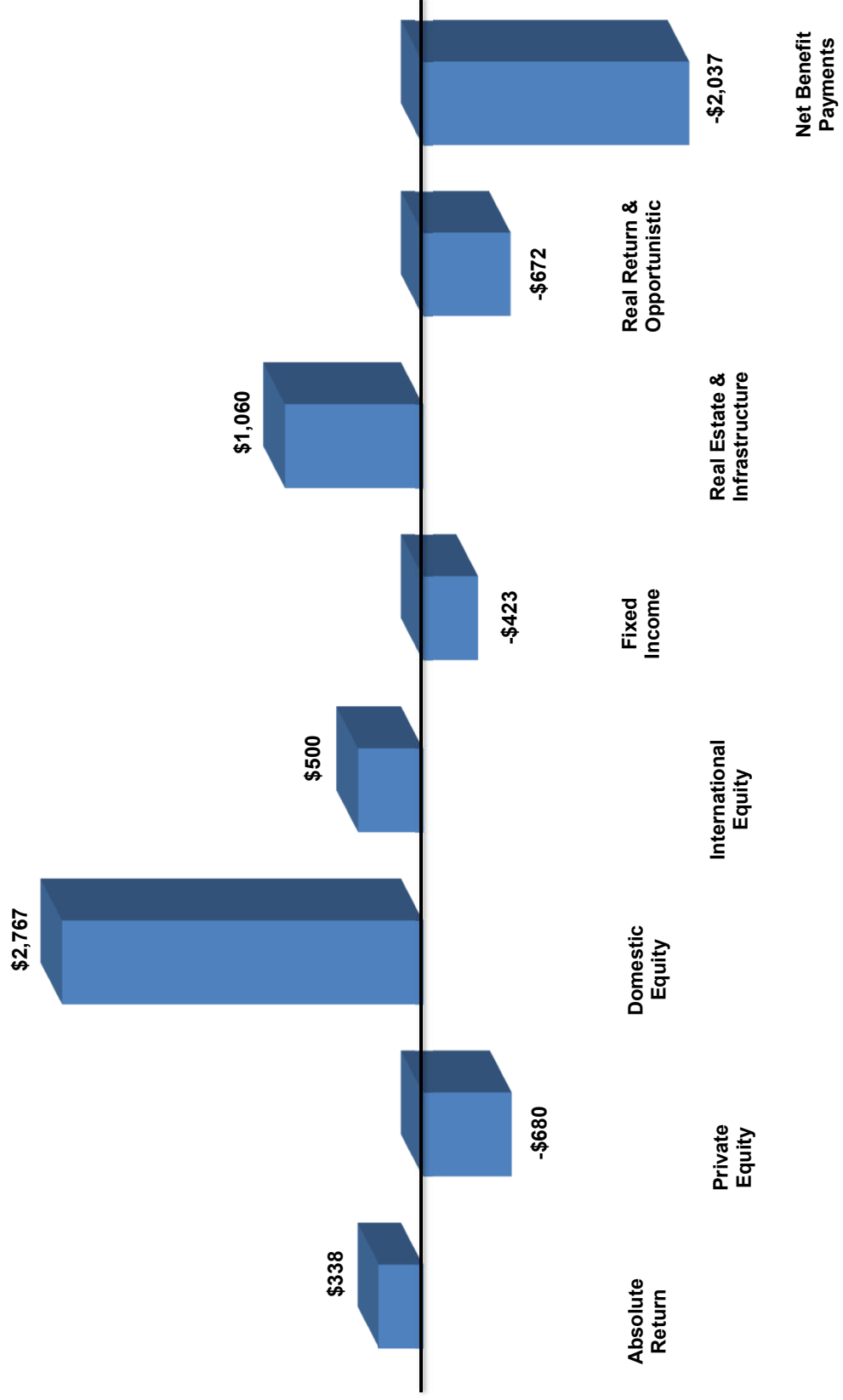
## Sources and Uses of Cash

### October 2018 ~ September 2019

10/01/18 Short-Term Cash Balance: \$ 1,827

9/30/19 Short-Term Cash Balance: 2,680

Net Short-Term Cash Increase: \$ 853



A negative number in an asset category indicates a use of cash, a positive number indicates a source of cash.

Dollars in millions

<b>Asset Allocation Targets</b> <b>As of 9/30/19</b>									
	MPERS		MSERS		MSPRS		MJRS		SMRS
<i>Asset Class</i>	<i>9/30/19</i>	<i>Target*</i>	<i>9/30/19</i>	<i>Target*</i>	<i>9/30/19</i>	<i>Target*</i>	<i>9/30/19</i>	<i>Target*</i>	<i>Ranges</i>
<b>Domestic Equity</b>	22.5%	28.0%	22.5%	28.0%	22.5%	28.0%	22.5%	28.0%	20% - 35%
<b>Private Equity</b>	18.6%	18.0%	18.6%	18.0%	18.6%	18.0%	18.6%	18.0%	10% - 20%
<b>International Equity</b>	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	15% - 25%
<b>Long Term Fixed Income</b>	13.6%	10.5%	13.6%	10.5%	13.6%	10.5%	13.6%	10.5%	10% - 20%
<b>Real Return &amp; Opportunistic</b>	10.8%	9.5%	10.8%	9.5%	10.8%	9.5%	10.8%	9.5%	5% - 15%
<b>Real Estate &amp; Infrastructure</b>	9.5%	10.0%	9.5%	10.0%	9.5%	10.0%	9.5%	10.0%	5% - 15%
<b>Absolute Return</b>	5.5%	6.0%	5.5%	6.0%	5.5%	6.0%	5.5%	6.0%	3% - 9%
<b>Short Term Fixed Income</b>	3.6%	2.0%	3.6%	2.0%	3.6%	2.0%	3.6%	2.0%	1% - 6%
<b>TOTAL</b>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
*Complies with basket clause and international restrictions.									

State of Michigan Retirement System

# MARKETS REVIEW AND OUTLOOK

State of Michigan Investment Board Meeting

December 19, 2019



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

## CAPITAL MARKETS

### Return and Risk Assumptions, Benchmark and Outlook

*A starting point.*

<b>MPSERS Plan</b>	<b>Assumed Return* (Arithmetic)</b>	<b>Standard Deviation*</b>	<b>Trailing 10-Year (Benchmark**)</b>
Private Equity	11.3%	30.0%	18.1%
International Equity	9.4%	21.4%	4.5%
Domestic Equity	7.7%	18.2%	13.2%
Real Estate (Core)	7.1%	11.5%	8.4%
Absolute Return	5.1%	9.0%	4.5%
Real Ret/Opportunistic	8.4%	9.5%	6.7%
Long-Term Fixed Income	2.3%	4.0%	3.8%
Short-Term	1.6%	1.0%	0.5%

\* Aon Investment Consultants 2019 Long-Term Return/Risk Assumptions

\*\* Investment Policy Statement; Annualized Returns

\*\*\* Actual investments may differ due to changing conditions and the availability of new information

### Overview

*A market update.*

- Capital market assumptions used for determining strategic asset allocations are being reduced across the board, and especially for safer, publicly traded fixed income securities. This is the general opinion for most consultants, investment banks, and other market participants. The reason for this phenomenon is the low interest rate environment caused by the policies of the Federal Reserve (Fed) and other central banks, as well as the run-up in prices for most risk assets over the past several years.
- The interest rate curve inversion that lasted through the summer of 2019 reverted to a positive slope by mid-October. An inverted yield curve is often cited as a warning indicator of an impending economic recession; however, a reversion of rates normally does not invalidate the power of the signal. In this instance, the market seems to be signaling it is content with the Fed's interest rate policy position now, compared to the Fed's stance late last year.
- The past decade, coming out from the Global Financial Crisis, has been characterized as a risk-on market; however, many traditional risk premia have not performed as expected. For example; U.S. small cap stocks have lagged large caps, value styles have lagged growth styles, foreign equities have lagged U.S. equities, and within foreign markets, emerging markets have lagged developed.
- Over the past ten, twenty, and thirty years, publicly traded REITs have out-performed private real estate by 2.7%, 3.3% and 3.3% annualized, respectively, though they are about three times more volatile.
- Since its inception, the Absolute Return portfolio's return has had a monthly beta of approximately 0.15 and annualized net alpha of 2.5%. The fund also has a low correlation to the Fixed Income benchmark; -0.1%, making it a good diversifier to equity and rates.

## **Interest Rates**

*The Fed cuts again.*

- At its October 2019 meeting, the Federal Open Market Committee voted to lower its key interest rate by 25 basis points, targeting a range between 1.5% to 1.75%. This was the third rate cut in 2019, however the Fed signaled that this would probably be the last cut of the year. The market is currently pricing the probability of just one additional rate cut out one year, in late 2020.
- The interest rate curve inversion that lasted through the summer of 2019 reverted to a positive slope by mid-October. An inverted yield curve is often cited as a warning indicator of an impending economic recession; however, a reversion of rates normally does not invalidate the power of the signal. In this instance, the market seems to be signaling it is content with the Fed's interest rate policy position now, compared to the Fed's stance late last year.
- By the end of October 2019, the U.S. 10-year Treasury was yielding 1.7% which was roughly 0.2% above the 3-month T-bill rate. This slightly positive slope is almost 70 bps higher than the greatest inversion of August 2019, though still another 70 bps flatter than a normally shaped yield curve.
- Spreads on investment-grade fixed income ended October at around its average level of 1.1%. Spreads on riskier high-yield assets were tighter at 50 basis points below average.

## **Domestic Equity**

*Size and Style factors in focus.*

- The broad U.S. stock market return for the one year ending September 2019 was 3.4%. Small caps represented by the Russell 2000 index have underperformed larger caps S&P 500 index over the past decade. Over the past one, three, five, seven, and ten years small caps have underperformed large caps by -13.1%, -5.2%, -2.7%, -2.8% and -2.0% annualized, respectively.
- The -13.1% underperformance of the Russell 2000 small cap index to the S&P 500 index over the past year would rank in the lowest decile of relative returns since 1979. However, investors betting on a reversion to normal should keep in mind that historically there has been no relationship between relative returns of one year to returns earned during the next year. Also, since 1979, the median 12-month return difference between the S&P 500 index and the Russell 2000 small cap index has been 0.6%.
- Meanwhile, value style in the U.S. performed relatively well over the past year ending September 2019, outperforming growth stocks by 2.0%. However, over longer time periods, value has underperformed growth by -4.8%, -4.1%, -2.8%, and -3.0% annualized over the past three, five, seven and ten years, respectively. Since 1985, the return difference between Value and Growth stocks in the U.S. is negligible.
- Many equity valuation metrics are near historical averages. However, the absolute returns over the next cycle may not be as strong as the historical average of 11 – 12% year-over-year total returns. One reason for this is the fact that market EPS is above trend as is returns on equity. However, some of the largest companies in the market today are less cyclical (economically sensitive) than past market leaders.

## **International Equity**

*A compelling case.*

- International equities underperformed domestic equities over the year ending October 2019 by -4.1%. Over the past three, five, seven, and ten years, the international market index, MSCI ACWI ex USA, underperformed the S&P 1500 index by -6.2%, -7.3%, -7.6%, and -8.3% annualized, respectively.
- A primary explanation for international equity's annualized underperformance of -8.3% is the annualized differences in change in the multiples (-8.9%) of the two indexes. The MSCI ACWI ex USA index multiple contracted at an annualized rate of -10.0% per year, while the multiple contraction in the U.S. market was approximately -1.1%. International earnings per share growth and dividend yields both were higher than the domestic equity index over the past decade.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 18.5% discount to U.S. counterparts while emerging markets are at a 35% discount.
- Within international equities, emerging market returns trailed developed markets over the past one, three, five, seven and ten years by -1.2%, -0.7%, -0.9%, -3.5%, and -1.6% annualized, respectively.

## **Real Estate**

*The benefit adding REITs.*

- Over the one year ending September 2019, the NAREIT index increased by 20.6% including dividends, significantly outpacing private real estate returns as measured by the NCREIF-ODCE Index by 15.1%. Over the past ten, twenty, and thirty years, publicly traded REITs have out-performed private real estate by 2.7%, 3.3% and 3.3% annualized, respectively, though they are about three times more volatile.
- Although investing in similar assets, the returns of publicly traded REITs and private real estate have historically been lowly (and at times are anti-) correlated to one another, meaning much of the REIT volatility is diversifiable.
- In fact, had the REID allocated up to 20% of its portfolio to REITs over the past decade, it could have earned approximately 130 basis points annualized higher returns without meaningfully changing the average annual volatility of returns.
- Dividend yields on REITs are around 3.5% which is nearly 1.8% higher than the yield of the ten-year U.S. Treasury. Historically, REIT dividend yields have averaged 1.2% higher than the ten-year U.S. Treasury.

## **Hedge Funds**

*Estimating the asset class return.*

- Since its inception, the Absolute Return portfolio's return has had a monthly beta of approximately 0.15 and annualized net alpha of 2.5%. The fund also has a low correlation to the Fixed Income benchmark, -0.1%, making it a good diversifier to equity and rates.
- Based on an expected annualized equity market return of approximately 6.9%, should historical hedge fund betas and alphas continue, a 4.9% annualized net return seems like a reasonable assumed rate of return for hedge funds. This return is approximately 3-month U.S. Libor plus 300 basis points.

## **Commodities**

*Safe havens on a roll.*

- Over the past ten years, commodities prices broadly have fallen, as measured by the Thomson Reuters CRB Commodity Index, down by roughly -33% from September 2009. Perhaps even more remarkable, commodities are still 13% lower than at the lowest of the Global Financial Crisis of 2008-2009.
- The price for crude oil has decreased over the past year ending September 2019, down -26% year-over-year to approximately \$54 per barrel.
- The U.S. dollar has strengthened over the past year. As measured by the DXY index, the dollar gained about 4.5% of value since September 2018 versus a basket of currencies.
- Safe haven commodity assets such as gold have performed well recently. At the end of September 2019, the dollar price for an ounce of gold was at \$1,465. This is 14.4% higher than the beginning of the year and 23% higher than one year prior. Over the past decade, the precious metal has appreciated by more than 45%, this is in sharp contrast to the broad commodity market in general.

# ECONOMIC OUTLOOK

## **Economic Overview**

*Will tariffs lead to a trade war?*

- The most recent reading of the annualized U.S. GDP growth was 1.9%, ahead of the consensus estimate of 1.6%. Current estimates for 2020 GDP growth for the U.S. are around 1.8%, however, there are increasingly more concerns regarding lower than forecasted growth.
- One primary area of concern is the changing global trade policies between the U.S. and its major trade partners, especially China, which are often referred to as a “trade war”. To date, various tariffs on Chinese exports have been levied, announcements for potential additional tariffs and negotiation meetings are made, and policy responses come from the trade partners.
- The JPMorgan Global Manufacturing Purchasing Manager Index (PMI) peaked in December 2017 and has been steadily declining since. In July 2019, the index fell to its lowest mark in over six years and it has been under 50 (deteriorating economic conditions) for six months in a row.
- Approximately half of the countries have PMIs below 50, though the U.S. PMIs are still showing some modest expansions.
- The Federal Reserve Bank of New York recession probability index currently estimates the chance of a recession occurring in the U.S. in the next 12 months to be around 30% after peaking earlier in the year near 40%. Important for consideration with this index, the measure has never hit 100% certainty even during a recession. In the last three recessions, the measure failed to hit over 50%, and in the last 50 years every measure of at least 30% has been associated with a recession.
- According to the U.S. Bureau of Economic Analysis, corporate profit earned in the U.S. peaked in Q3-2018 at just over \$1.87 trillion and its growth is essentially flat over the past four and a half years and is currently at \$1.79 trillion.
- Nationally the unemployment rate is very low by historical standards at 3.6%. The economy is still adding jobs, however, according to data from the Bureau of Labor Statistics, the six-month average rate of 112,000 jobs added is a nine-year low.



## Annual Total Returns of Key Asset Classes 1999 - 2018

		Best ↑ ↓ Worst																	
1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Int'l Equity	Gov't Bonds	Corp. Bonds	Gov't Bonds	Int'l Equity	Int'l Equity	Real Estate	Int'l Equity	Int'l Equity	Gov't Bonds	Int'l Equity	U.S. Equity	Real Estate	Int'l Equity	U.S. Equity	Real Estate	U.S. Equity	U.S. Equity	Int'l Equity	Real Estate
26.97%	13.23%	10.40%	11.50%	40.82%	20.90%	20.06%	26.65%	16.65%	12.38%	41.44%	16.38%	14.26%	16.83%	32.80%	13.08%	11.93%	27.19%	6.71%	
U.S. Equity	Real Estate	Real Estate	Corp. Bonds	U.S. Equity	Real Estate	Int'l Equity	Real Estate	Real Estate	Cash	U.S. Equity	Real Estate	Gov't Bonds	U.S. Equity	Int'l Equity	Real Estate	Real Estate	U.S. Equity	Infla- tion	Infla- tion
20.27%	12.24%	7.28%	10.52%	29.58%	14.48%	16.62%	16.59%	15.84%	2.05%	27.24%	13.11%	9.02%	16.17%	15.29%	11.81%	7.97%	21.13%	1.91%	
Hedge Funds	Corp. Bonds	Gov't Bonds	Real Estate	Hedge Funds	U.S. Equity	U.S. Equity	U.S. Equity	Gov't Bonds	Infla- tion	Corp. Bonds	Int'l Equity	Corp. Bonds	Real Estate	Real Estate	Corp. Bonds	Corp. Bonds	Corp. Bonds	Real Estate	Cash
18.93%	9.40%	7.24%	6.74%	9.01%	11.78%	5.65%	15.34%	8.67%	0.10%	16.05%	11.15%	8.35%	10.54%	10.99%	7.53%	5.63%	6.96%	1.88%	
Real Estate	Cash	Cash	Hedge Funds	Real Estate	Hedge Funds	Hedge Funds	Hedge Funds	Hedge Funds	Corp. Bonds	Hedge Funds	Corp. Bonds	Infla- tion	Corp. Bonds	Hedge Funds	Gov't Bonds	Int'l Equity	Int'l Equity	Corp. Bonds	Gov't Bonds
11.36%	6.16%	4.43%	3.57%	8.99%	5.83%	5.13%	9.21%	7.68%	-3.07%	9.65%	8.46%	2.96%	9.37%	7.70%	4.92%	4.50%	6.42%	0.88%	
Cash	Hedge Funds	Hedge Funds	Infla- tion	Corp. Bonds	Corp. Bonds	Infla- tion	Cash	U.S. Equity	Real Estate	Infla- tion	Gov't Bonds	U.S. Equity	Hedge Funds	Infla- tion	Hedge Funds	Infla- tion	Hedge Funds	Hedge Funds	Hedge Funds
4.83%	5.77%	3.11%	2.39%	7.69%	5.25%	3.42%	4.81%	5.47%	-6.46%	2.72%	5.52%	1.75%	4.22%	1.49%	3.14%	2.09%	3.88%	-1.05%	
Infla- tion	Infla- tion	Infla- tion	Cash	Gov't Bonds	Gov't Bonds	Cash	Corp. Bonds	Corp. Bonds	Hedge Funds	Cash	Hedge Funds	Cash	Gov't Bonds	Cash	Infla- tion	Cash	Hedge Funds	Gov't Bonds	Corp. Bonds
2.68%	3.39%	1.55%	1.79%	2.36%	3.48%	3.06%	4.27%	5.10%	-19.86%	0.19%	5.07%	0.10%	2.02%	0.07%	0.68%	1.89%	2.30%	-2.51%	
Corp. Bonds	U.S. Equity	U.S. Equity	Int'l Equity	Infla- tion	Infla- tion	Gov't Bonds	Gov't Bonds	Cash	U.S. Equity	Gov't Bonds	Infla- tion	Hedge Funds	Infla- tion	Corp. Bonds	Cash	Gov't Bonds	Gov't Bonds	Infla- tion	U.S. Equity
-1.94%	-6.98%	-10.64%	-14.95%	1.88%	3.25%	2.65%	3.46%	5.03%	-36.72%	-2.19%	1.50%	-3.55%	1.70%	-2.01%	0.04%	1.05%	2.12%	-4.96%	
Gov't Bonds	Int'l Equity	Int'l Equity	U.S. Equity	Cash	Cash	Corp. Bonds	Infla- tion	Infla- tion	Int'l Equity	Real Estate	Cash	Int'l Equity	Cash	Gov't Bonds	Int'l Equity	Cash	Cash	Cash	Int'l Equity
-2.25%	-15.31%	-19.74%	-21.30%	1.16%	1.33%	1.95%	2.55%	4.06%	-45.52%	-16.86%	0.13%	-13.71%	0.11%	-2.60%	-3.87%	0.27%	0.84%	-14.20%	

Annualized Returns 1999 - 2018									
	Cash	Infl.	Hedge	Gov't.	Corp.	Int'l.	US Eq.	R.E.	
Return	1.90%	2.17%		4.12%	5.24%	4.64%	5.99%	8.97%	Return
Risk	1.01%	1.34%	5.14%	4.46%	5.18%	18.85%	16.06%	4.55%	Risk

- Hedge Funds are represented by the HFRI FOF Conservative Index
- Inflation is represented by the U.S. Consumer Price Index
- International Equity is represented by the MSCI - AC World EX-USA Index
- Cash is represented by 30-day T-Bills

- U.S. Equity is represented by the S&P 1500
- Real Estate is represented by the NPI
- Corporate Bonds are represented by the Baa
- Government Bonds are represented by the Baa

State of Michigan Retirement System

# FIXED INCOME REVIEW

State of Michigan Investment Board Meeting  
December 19, 2019



Daniel J. Quigley  
Senior Investment Manager  
Fixed Income Division

## EXECUTIVE SUMMARY

### Performance

<b>MPSERS Plan (9/30/19)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Annualized Returns	9.7%	4.6%	4.8%	4.0%	4.9%
Bloomberg Barclays US Agg	10.3%	2.9%	3.4%	2.7%	3.8%
Peer Median Returns	8.9%	3.8%	4.0%	3.0%	4.7%
Percentile Rank vs. Peers*	34	16	14	19	37

\*State Street Universe greater than \$1 billion

- The fixed income portfolio underperformed its benchmark on a one-year basis. The portfolio has outperformed its benchmark and peer group across all other time periods. This year-over-year (YOY) underperformance was driven by an underweight to duration. The absolute performance was strong during the year for both rates-based and credit-based fixed income strategies.
- The duration positioning of the internal portfolio helped performance as an overweight to floating-rate securities and longer duration securities outperformed intermediate duration bonds.
- Investment Grade and High Yield credit experienced a strong recovery in the first half of the year after underperforming in the 4<sup>th</sup> quarter of 2018. The Structured Fixed Income portion of the portfolio has slightly underperformed the benchmark on a one-year basis but has outperformed over longer time horizons.

### Strategy Update

- The objective of the Fixed Income Division portfolio is to meet or exceed the returns of the Bloomberg U.S. Aggregate Bond Index while satisfying the overall characteristics of a core fixed income portfolio. These characteristics are: income, liquidity, principal preservation, and diversification from equity market risk. The portfolio has a higher yield than the benchmark without having meaningfully more risk than the U.S. Aggregate Index. The yield-to-maturity of the portfolio is currently 3.4% versus a benchmark yield of 2.3%. In addition to this, the portfolio has an equity beta of 0.0, in line with the U.S. Aggregate Index.
- The Core-plus strategy implemented to achieve this goal includes:
  - Core: As of September 30, 2019, the portfolio's allocation to U.S. Treasuries, Investment Grade corporate bonds, government-guaranteed U.S. Agency Debentures, RMBS, and Commercial Mortgage Backed Securities (CMBS) was 63.5%. This includes a 25.7% allocation to U.S. Treasuries, TIPS, and cash.
  - Plus: The portfolio maintains a strategic out-of-benchmark allocation to high-yield corporate debt, securitized credit, and global fixed income strategies as market opportunities allow. This allocation increases the portfolio yield and total return potential, but will result in lower liquidity and higher volatility. The allocation to the Plus portfolio was 36.5% as of September 30, 2019.

### Tactical Update

- The allocation to securitized credit, primarily in CMBS, ABS, non-agency RMBS, and CLO securities, was 27.5% of the portfolio at the end of the quarter. The combination of low interest rate duration and high coupon income (often floating rate) offers attractive characteristics for

the overall fixed income portfolio. This portion of the portfolio had a return of 6.3% on a one-year basis, underperforming the benchmark on a relative basis by 4.0%.

- The allocation to high-yield strategies was 5.4% at the end of the quarter. This out-of-benchmark position has benefitted portfolio performance on a long-term basis but has underperformed recently as the high yield portion of the portfolio had a return of 8.6% on a one-year basis, roughly 1.7% below the 10.3% return of the index.
- The portfolio has a meaningful allocation to floating rate securities, including AAA CLO investments and investment-grade floating rate corporate bonds. This allocation accounts for approximately 20% of portfolio assets. This allocation will underperform in a falling interest rate environment, but should exhibit strong risk-adjusted return characteristics in many market environments.
- The allocation to U.S. TIPS decreased slightly during the quarter, finishing the quarter at 3.3% of the fixed income portfolio. The TIPS allocation has performed in line with nominal U.S. Treasuries on a year-to-date (YTD) basis, but has underperformed over the past year. We believe that this allocation offers an attractive hedge to the portfolio should inflation expectations increase in the future.

### **Market Environment and Outlook**

- The yield curve for U.S. Treasury securities flattened for the quarter and the three-month to ten-year portion of the yield curve remained inverted with three-month U.S. Treasury Bills ending the quarter with a yield of 1.82%, 15 bp higher than the ten-year U.S. Treasury Bond yield of 1.67%. This was primarily driven by declining long-term interest rates. The yield on the ten-year U.S. Treasury decreased by 34 bp for the quarter and by 140 bp on a year-over-year (YOY) basis.
- Inflation expectations decreased during the quarter with ten-year breakeven inflation expectations ending September at 1.52%. This was an 18 bp decrease for the quarter.
- Credit markets continued their recovery with high-yield spreads ending September at 373 bp. This represented a 164 bp decrease for spread YTD. These spread levels are roughly 60 bp tighter than their five-year average. Investment grade credit spreads tightened by 42 bp YTD to 115 bp, 12 bp tighter than the five-year average. The YTD performance of the Investment Grade index is 13.20% and the High Yield index return is 11.41%.
- Emerging Markets debt underperformed during the quarter with EM spreads widening by 33 bp during the quarter. This spread widening was offset by declining interest rates, allowing the EM USD index to continue to experience positive performance. The EM USD index has returned 10.79% YTD.
- Developed market interest rates declined across most major markets during the quarter as investors priced in lower global growth expectations. The yield on the ten-year German Bund ended the quarter at -0.57%, down 104 bp on a YOY basis. The Japanese JGB ended the quarter with a ten-year yield of -0.21%.

### **Conclusion**

- The portfolio maintains a defensive position for rising interest rates. The duration remains short of the benchmark and the portfolio maintains an underweight to long-term debt. This position is offset through a larger allocation to structured and corporate debt securities which increases the income of the portfolio. The portfolio has also reduced corporate credit exposure due to poor valuations in various credit markets. The portfolio will continue to look for attractive risk-adjusted opportunities within the fixed income opportunity set.

# SMRS

## Fixed Income by Strategy

### 9/30/19

	Amount	Total	% of Total
<b>Core</b> (\$ in Millions)			
FID Internal	\$5,261		
PIMCO Mortgage Fund	367		
PGIM Investment Grade Credit	257		
<b>Total Core</b>		<b>\$5,886</b>	<b>57.9%</b>
<b>Tactical</b>			
Pyramis	\$331		
Loomis Core Plus	246		
<b>Total Tactical</b>		<b>\$576</b>	<b>5.7%</b>
<b>Securitized Debt</b>			
Met West Securitized Ops	\$486		
Napier Park CLO Debt	475		
Napier Park ABS Income	430		
Principal CMBS	429		
TICP CLO Debt	370		
Fortress Credit ABI	352		
Putnam DMS	150		
Napier Park Strategic Loan	110		
<b>Total Securitized Debt</b>		<b>\$2,802</b>	<b>27.5%</b>
<b>High Yield</b>			
PGIM High Yield	\$264		
Columbia Management	250		
Crescent Direct Lending	37		
<b>Total High Yield</b>		<b>\$552</b>	<b>5.4%</b>
<b>Global</b>			
T. Rowe Global Multi-Sector	\$249		
PGIM Global Liquid Relative Value	105		
<b>Total Global</b>		<b>\$354</b>	<b>3.5%</b>
<b>TOTAL</b>		<b><u>\$10,170</u></b>	<b><u>100.0%</u></b>

NOTE: Totals may not be exact due to rounding.

# SMRS

## Fixed Income Holdings Portfolio Characteristics

Benchmark: Barclays Aggregate

9/30/19

Characteristic	Portfolio	Benchmark
Average Maturity (Yrs)	7.6	7.8
Duration (Yrs)	5.0	5.7
Spread Duration (Yrs)	5.7	6.0
Coupon (%)	3.6	3.2
Yield to Maturity (%)	3.4	2.3
Credit Rating	A	AA
VaR (%)	4.2	5.0
Tracking Error	1.2	NA
Beta (vs S&P 500)	0.02	-0.04

### Commentary

#### Objectives

Income:

Liquidity:

Principal Preservation:

Diversification:

#### Highlights

The coupon of the portfolio is approximately 40 bps higher than the benchmark. Price appreciation has been the main driver of U.S. bond market returns YTD but Income is the primary driver of long-term performance.

25.7% of the portfolio is invested in cash, U.S. Treasuries, and TIPS. These investments can be liquidated via same-day trading.

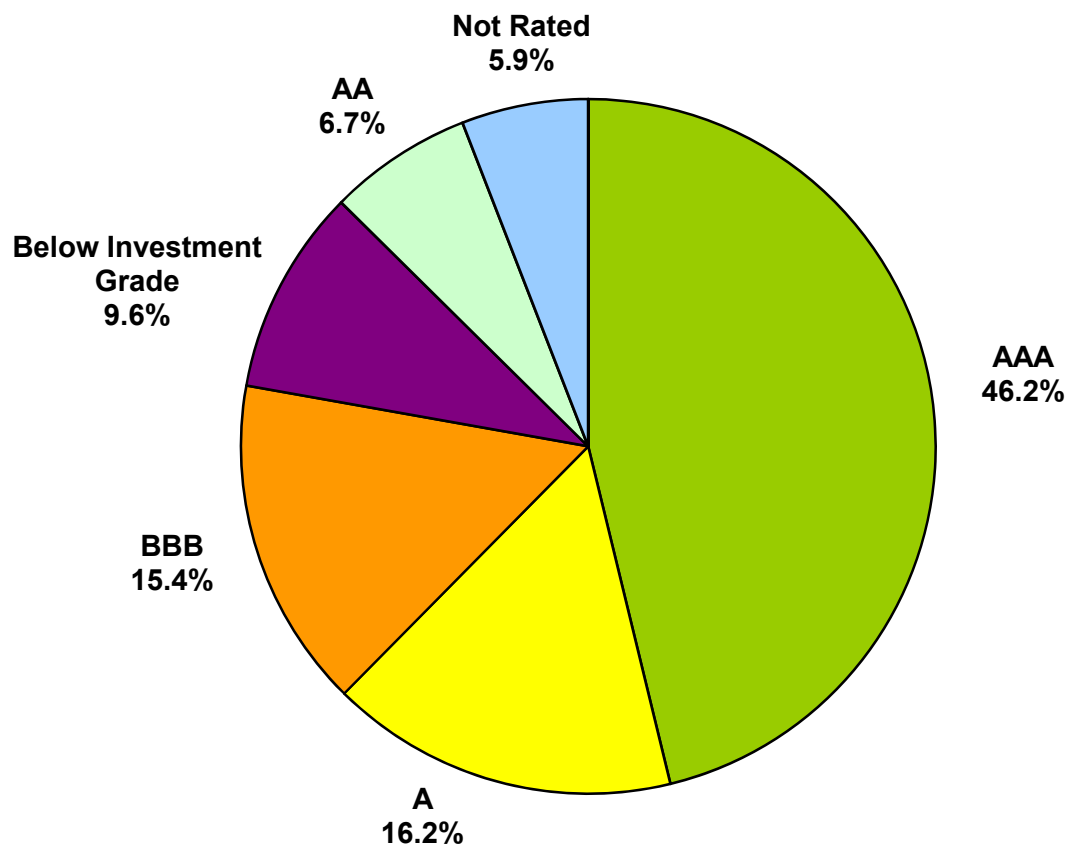
The portfolio has a large allocation to U.S. Treasuries and carries an investment-grade credit rating.

The equity beta of the portfolio is roughly 0.0 meaning that the portfolio returns are uncorrelated with equity market movements, and in line with the benchmark bond index.

# SMRS

## Fixed Income By Rating

### 9/30/19



Market Value in Millions				
9/30/19				
	Assets	Percent	Benchmark	Difference
AAA	\$4,699	46.2%	71.5%	-25.3%
AA	686	6.7%	3.2%	3.5%
A	1,643	16.2%	10.6%	5.6%
BBB	1,565	15.4%	12.5%	2.9%
* Below Investment Grade	974	9.6%	0.6%	9.0%
Not Rated	603	5.9%	1.6%	4.3%
<b>Total Investments</b>	<b>\$10,170</b>	<b>100.0%</b>	<b>100.0%</b>	

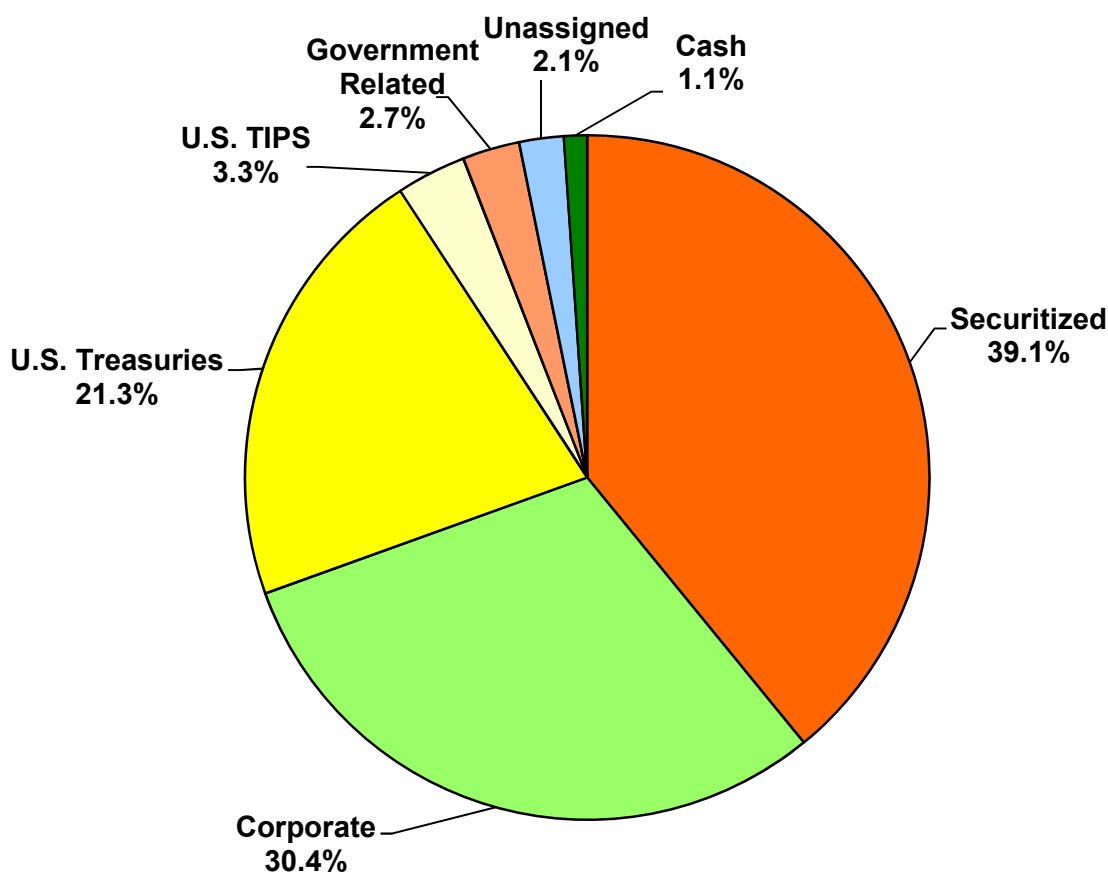
\* Comprised of approximately 7.2% High Yield Credit and 2.4% High Yield RMBS/ABS

Benchmark: Barclays US Aggregate

# SMRS

## Fixed Income By Asset Type

### 9/30/19



Market Value in Millions				
9/30/19				
	Assets	Percent	Benchmark	Difference
Securitized	\$3,975	39.1%	29.3%	9.8%
Corporate	3,091	30.4%	25.1%	5.3%
U.S. Treasuries	2,163	21.3%	39.8%	-18.5%
U.S. TIPS	338	3.3%	0.0%	3.3%
Government Related	273	2.7%	5.8%	-3.1%
Unassigned	221	2.1%	0.0%	2.1%
Cash	109	1.1%	0.0%	1.1%
<b>Total Investments</b>	<b>\$10,170</b>	<b>100.0%</b>	<b>100.0%</b>	

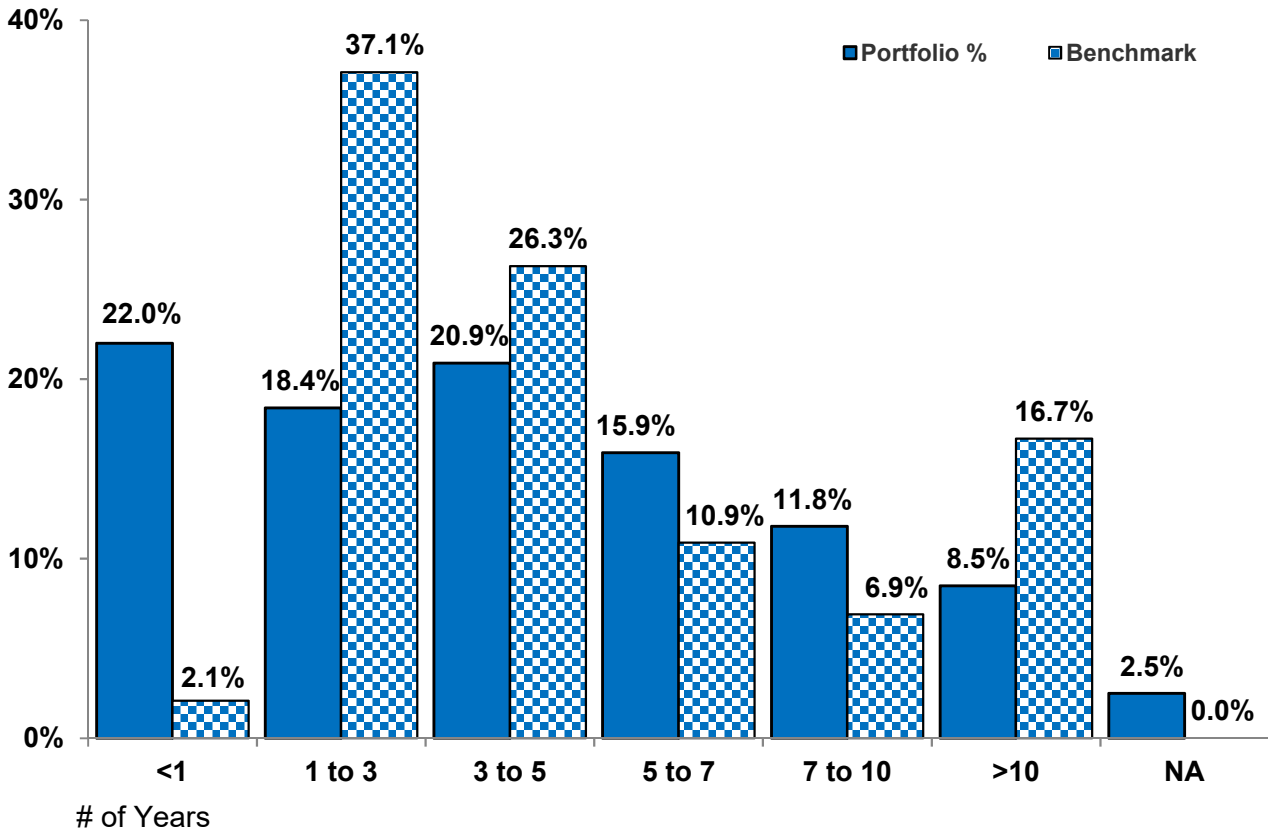
Benchmark: Barclays US Aggregate



# SMRS

## Duration Distribution

### Fixed Income Composite Versus Benchmark 9/30/19



Source: Factset

Market Value in Millions					
Duration	Assets	Portfolio Weight	Benchmark Weight	Portfolio Duration*	Benchmark Duration*
<1	\$2,240	22.0%	2.1%	0.1	0.8
1 to 3	1,876	18.4%	37.1%	2.3	2.1
3 to 5	2,121	20.9%	26.3%	4.1	3.8
5 to 7	1,612	15.9%	10.9%	6.0	5.9
7 to 10	1,205	11.8%	6.9%	8.0	7.9
>10	866	8.5%	16.7%	19.1	16.5
NA	250	2.5%	0.0%	0.0	0.0
<b>Total</b>	<b>\$10,170</b>	<b>100.0%</b>	<b>100.0%</b>	<b>5.0</b>	<b>5.7</b>

\* Effective Duration

Benchmark: Barclays US Aggregate

## Total Fixed Income Performance - Net of Fees (MPSERS)

**9/30/19**

	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>10-Years</u>
<b>Total Fixed Income</b>	<b>\$10,169,933,891</b>	<b>9.52%</b>	<b>4.35%</b>	<b>4.61%</b>	<b>3.88%</b>	<b>4.77%</b>
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>10.30%</i>	<i>2.92%</i>	<i>3.38%</i>	<i>2.72%</i>	<i>3.75%</i>
<b>Internal Core Fixed Income</b>	<b>5,261,318,673.22</b>	<b>11.06%</b>	<b>4.09%</b>	<b>4.54%</b>	<b>3.69%</b>	<b>4.47%</b>
<b>Externally Managed Core Fixed Income</b>	<b>\$367,185,516</b>	<b>7.68%</b>	<b>4.88%</b>	<b>4.72%</b>	<b>4.08%</b>	<b>5.29%</b>
<b>PIMCO Mortgage Fund</b>	367,185,516	8.06%				
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>10.30%</i>	<i>2.92%</i>	<i>3.38%</i>	<i>2.72%</i>	<i>3.75%</i>
<b>Investment Grade Credit</b>	<b>\$257,399,674</b>	<b>12.66%</b>	<b>4.57%</b>	<b>4.92%</b>	<b>4.32%</b>	<b>5.80%</b>
<b>PGIM Investment Grade</b>	257,399,674	12.66%	4.57%	4.92%	4.41%	5.85%
<i>Bloomberg/Barclays Credit Index</i>	<i>N/A</i>	<i>12.63%</i>	<i>4.33%</i>	<i>4.54%</i>	<i>3.89%</i>	<i>5.32%</i>
<b>Tactical Fixed Income</b>	<b>\$576,425,990</b>	<b>9.64%</b>	<b>4.90%</b>	<b>4.37%</b>	<b>6.04%</b>	<b>10.97%</b>
<b>Loomis Sayles CorePlus</b>	245,684,951	9.04%	3.81%	3.59%		
<b>Fidelity Tactical Bond Fund</b>	330,741,039	10.24%	5.02%	5.17%		
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>10.30%</i>	<i>2.92%</i>	<i>3.38%</i>	<i>2.72%</i>	<i>3.75%</i>
<b>High Yield Fixed Income</b>	<b>\$551,909,800</b>	<b>8.60%</b>	<b>6.03%</b>	<b>5.92%</b>		
<b>Columbia Management High Yield</b>	250,281,065	8.72%	5.76%	5.84%		
<b>PGIM High Yield</b>	264,270,854	8.63%	6.41%	6.07%		
<b>Crescent Direct Lending</b>	37,357,881	6.09%				
<i>Bloomberg/Barclays US HY BA/B 2% Cap</i>	<i>N/A</i>	<i>8.30%</i>	<i>6.03%</i>	<i>5.46%</i>		
<b>Structured Fixed Income</b>	<b>\$2,801,742,094</b>	<b>6.34%</b>				
<b>Principal CMBS</b>	428,896,825	10.25%	5.73%	5.09%	6.92%	11.62%
<b>MetWest Securitized Opportunities</b>	485,588,696	6.04%	5.25%	4.01%		
<b>Napier Park ABS Income</b>	430,185,161	9.40%	10.62%			
<b>Napier Park Strategic Loan LP</b>	110,232,425	6.21%				
<b>Napier Park CLO Debt</b>	474,513,953	3.04%				
<b>TICP CLO Debt</b>	370,374,784	3.07%				
<b>Fortress ABI</b>	351,941,594					
<b>Putnam DMS</b>	150,008,655					
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>10.30%</i>	<i>2.92%</i>	<i>3.38%</i>	<i>2.72%</i>	<i>3.75%</i>
<i>Blended CMBS Benchmark</i>	<i>N/A</i>	<i>10.40%</i>	<i>2.62%</i>	<i>4.51%</i>	<i>3.56%</i>	<i>6.25%</i>
<b>Global Fixed Income</b>	<b>\$353,952,144</b>	<b>7.58%</b>	<b>4.03%</b>			
<b>T. Rowe Global Multi-Sector</b>	249,249,644	9.99%	4.51%			
<b>PGIM GLRV</b>	104,702,500	2.24%				
<i>Custom GMS Benchmark</i>	<i>N/A</i>	<i>10.61%</i>	<i>4.61%</i>			

State of Michigan Retirement System

# DOMESTIC EQUITY REVIEW

State of Michigan Investment Board Meeting  
December 19, 2019



Jack A. Behar, CFA  
Senior Investment Manager  
Domestic Equity Division

## EXECUTIVE SUMMARY

### **Performance**

<b>MPSERS Plan (9/30/19)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Annualized Returns	2.6%	14.2%	10.6%	13.5%	13.1%
S&P 1500	3.4%	13.0%	10.7%	13.1%	13.2%
Peer Median Return	2.2%	9.8%	7.7%	10.3%	11.0%
Percentile Rank vs. Peers *	43	12	19	13	31

\*State Street Universe greater than \$1 billion

- Total Domestic Equity outperformed its peer group over all time periods as well as the S&P 1500 over three and seven-year time periods. During the past year performance was 90 basis points (bps) behind the benchmark net of fees, with incurred tracking error of 2.0%.
- SMRS pays roughly 8 bps per year in domestic equity fees versus its peer group at an estimated 20-25 bps (per the research of Aon/Hewitt in 2017), making net of fee peer group comparisons more favorable than what the table above indicates.
- While a number of managers in our portfolio struggled relative to the benchmark in Q3 amidst volatile markets, there were a few bright spots. Mellon Capital continued its run of exceptional performance, combining high beta S&P 500 exposure with long dated treasuries, both of which outperformed in the quarter. Mellon Capital, Clarkston Capital, LA Capital and SMRS's Large Cap Consistent Growth Fund also posted strong one-year numbers, keeping the division within striking distance of the benchmark.
- Individual contributors to division performance included Michigan's Ally Financial, General Electric, Conagra, Safehold, Everest Reinsurance, Worldpay, Home Depot and long dated treasuries. The division also benefitted from having very little oil and gas exposure. Detractors included AGNC Investment Corp, Annaly Capital Management and Gilead Sciences.

### **Asset Class Goal**

To provide the SMRS with long-term domestic equity market returns or better, by investing in a diversified and attractively valued portfolio of companies at an index fund-like cost.

### **Strategy Update**

- The Domestic Equity Portfolio is overweight the financial sector, defensive stocks and health care while remaining underweight consumer discretionary and commodity related sectors. Its estimated portfolio beta is 1.1, so a significant market correction would present a modest headwind to performance.

- Total Domestic Equity's portfolio would outperform the S&P 1500 by nearly 25% were it to appreciate to the market multiple of 18x from where it stands now at 14.4x, or if multiples between it and the benchmark were otherwise to converge.
- In the event that multiples do not converge, the division remains in a position to outperform based on its higher level of dividend yield, coupled with faster earnings per share growth than the S&P 1500.
- At the broader portfolio level, allocations to attractively valued financial and defensive stocks offset each other from an interest rate risk standpoint, paving the way for potential outperformance in most stable rate environments.

### **Market Environment and Outlook**

- At ~18x forward earnings, equity markets trade at a premium to their historical average of 15.7x and in line with their twenty-five-year historical average of 18x.
- Factoring in the existing low level of interest rates, stocks are reasonably priced for an environment where long-term bond yields are 4% or lower.
- The market is currently paying out 2.0% of its earnings in dividends and reducing shares outstanding by 3.0% by way of share buybacks, for a 5.0% total shareholder yield.
- The market is also growing shareholders' equity at a rate of 1.9% by reinvesting a little more than 10% of its earnings back into its underlying businesses. Reinvestment growth has likely been significantly impacted by trade tensions and may well move higher in an environment with greater business certainty.
- The market is thus poised to earn roughly 6.9% (shareholder yield of 5.0% + reinvestment rate of 1.9%) in an environment where stock multiples and returns on equity are stable. As discussed above, growth rates, and therefore returns, will likely be higher against a more stable economic backdrop.
- Prospective market returns compare favorably to the 30-year U.S. Treasury at 2.1%, and unfavorably to the historical compound annual return for the S&P 500 from 1928 – 2018 of 9.5%.

# SMRS

## Domestic Equity Strategies

9/30/19

Markets	Amount	Total	% of Total
<b>Internal Indexed</b> (\$ in Millions)			
Indexed Portfolios	\$6,820		
<b>Total Indexed</b>		<b>\$6,820</b>	<b>40.6%</b>
<b>Internal Active</b>			
Active Portfolios	\$5,192		
<b>Total Internal Active</b>		<b>\$5,192</b>	<b>30.9%</b>
<b>External Active</b>			
Los Angeles Capital	\$1,251		
Mellon Capital	1,018		
Fisher Investments	656		
Seizert Capital Partners	543		
Clarkston Capital Partners	488		
ARK Investments	436		
Attucks Asset Management	135		
Bivium Capital	133		
Ancora	95		
NorthPointe Capital	<u>22</u>		
<b>Total External Active</b>		<b>\$4,777</b>	<b>28.5%</b>

**Total Domestic Equity**

**\$16,789**

**100.0%**

# SMRS

## Domestic Equities Composite

### 9/30/19

Date:	<u>9/30/19</u>	<u>6/30/19</u>	<u>3/31/19</u>	<u>12/31/18</u>
Assets (\$ in Millions):	\$16,789	\$16,636	\$17,963	\$15,693
Number of Securities:	1,316	1,296	1,314	1,295
Active Share:	43%	49%	47%	49%

Description: The Domestic Equities Composite combines both the SMRS' Actively Managed Composite and its index funds.

<b>Characteristics</b>	<b><u>SMRS</u></b>	<b><u>S&amp;P 1500</u></b>	<b><u>S&amp;P 1500 Value</u></b>
Market Capitalization (\$ in Billions)	\$216.8	\$225.6	\$178.3
P/E FY1	14.4x	17.9x	14.6x
P/E upside to S&P 1500	24.2%	0.0	22.6%
Price/Book	3.2x	3.1x	2.1x
Return on Equity	20.9%	17.3%	14.8%
<b>Risk Metrics</b>			
Beta	1.07	1.00	0.88
Tracking Error	1.8%	0.0%	3.8%
<b>Projected Returns</b>			
Dividend Yield	2.8%	2.0%	2.5%
Buyback Yield	3.0%	3.0%	3.6%
Reinvestment Rate	<u>3.5%</u>	<u>1.9%</u>	<u>1.5%</u>
<b>Projected Investment Return</b>	<u><b>9.3%</b></u>	<u><b>6.9%</b></u>	<u><b>7.6%</b></u>

### TOP TEN EXPOSURES – Domestic Equities vs S&P 1500

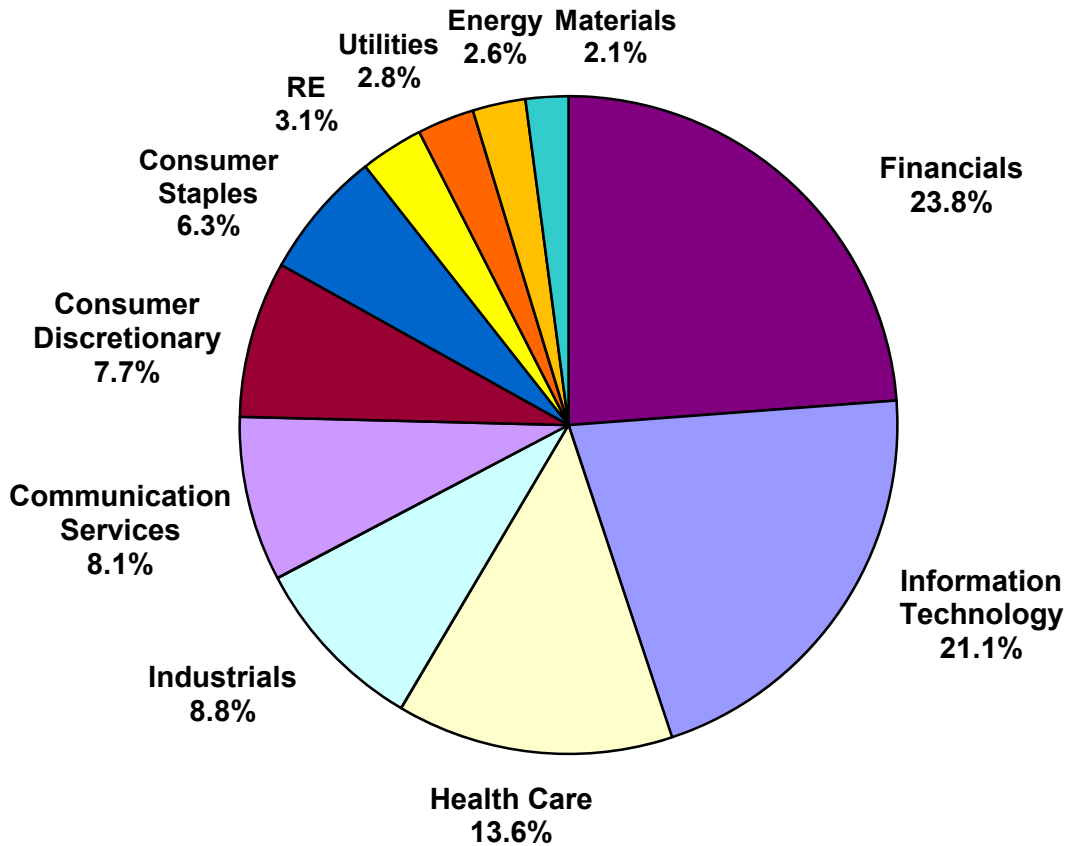
#### 9/30/19

<b><u>Domestic Equity Portfolio</u></b>			<b><u>S&amp;P 1500</u></b>		
<b><u>Company Name</u></b>	<b><u>Portfolio Weight</u></b>	<b><u>FY1 P/E</u></b>	<b><u>Company Name</u></b>	<b><u>Market Weight</u></b>	<b><u>FY1 P/E</u></b>
SPDR S&P 500 ETF Trust	15.1%	17.6	Microsoft Corp.	3.9%	25.8
SPDR Port. LT Treasury ETF	4.6%	42.6	Apple, Inc.	3.6%	19.2
Berkshire Hathaway, Inc. B	2.9%	13.6	Amazon.com, Inc.	2.7%	72.2
Microsoft Corp.	2.7%	25.8	Facebook, Inc. Class A	1.6%	27.1
Apple, Inc.	2.4%	19.2	Berkshire Hathaway, Inc. B	1.5%	13.6
AGNC Investment Corp.	2.2%	7.9	JPMorgan Chase & Co.	1.4%	11.0
Amazon.com, Inc.	1.6%	72.2	Alphabet, Inc., Class C	1.4%	24.4
Wells Fargo & Company	1.5%	10.0	Alphabet, Inc., Class A	1.3%	24.4
CVS Health Corp.	1.3%	8.7	Johnson & Johnson	1.3%	15.3
Gilead Sciences, Inc.	1.3%	8.8	Procter & Gamble Co.	1.1%	24.9
<b>TOTAL</b>	<b><u>35.6%</u></b>	<b><u>16.5</u></b>	<b>TOTAL</b>	<b><u>19.8%</u></b>	<b><u>21.7</u></b>

# SMRS

## Domestic Equity By Sector

### 9/30/19



Market Value in Millions				
9/30/19				
	Assets	Percent	Benchmark	Difference
Financials	\$3,991	23.8%	13.3%	10.5%
Information Technology	3,536	21.1%	21.3%	-0.2%
Health Care	2,282	13.6%	13.4%	0.2%
Industrials	1,481	8.8%	10.0%	-1.2%
Communication Services	1,361	8.1%	9.6%	-1.5%
Consumer Discretionary	1,294	7.7%	10.4%	-2.7%
Consumer Staples	1,062	6.3%	7.2%	-0.9%
Real Estate	518	3.1%	3.8%	-0.7%
Utilities	477	2.8%	3.6%	-0.8%
Energy	429	2.6%	4.4%	-1.8%
Materials	358	2.1%	3.0%	-0.9%
<b>Total</b>	<b>\$16,789</b>	<b>100.0%</b>	<b>100.0%</b>	

Benchmark: S&P 1500



# SMRS

## Actively Managed Composite

### 9/30/19

<b>Date:</b>	<b><u>9/30/19</u></b>	<b><u>6/30/19</u></b>	<b><u>3/31/19</u></b>	<b><u>12/31/18</u></b>
Assets (\$ in Millions):	\$9,969	\$9,911	\$10,005	\$8,655
Number of Securities:	1,052	1,036	1,086	1,021
Active Share:	72%	82%	83%	85%

Description: The Actively Managed Composite is designed to add consistent alpha by investing in managers with value-added, but diverse strategies. While the expectation is that most will outperform over time, the composite is designed such that they do so during differing parts of the business cycle.

<b>Characteristics</b>	<b><u>SMRS</u></b>	<b><u>S&amp;P 1500</u></b>	<b><u>S&amp;P 1500 Value</u></b>
Market Capitalization (\$ in Billions)	\$179.4	\$225.6	\$178.3
P/E FY1	12.7x	17.9x	14.6x
P/E upside to S&P 1500	40.8%	0.0	22.6%
Price/Book	3.1x	3.1x	2.1x
Return on Equity	22.7%	17.3%	14.8%
<b>Risk Metrics</b>			
Beta	1.12	1.00	0.88
Tracking Error	3.1%	0.0%	3.8%
<b>Projected Returns</b>			
Dividend Yield	3.4%	2.0%	2.5%
Buyback Yield	3.0%	3.0%	3.6%
Reinvestment Rate	4.2%	1.9%	1.5%
<b>Projected Investment Return</b>	<b><u>10.6%</u></b>	<b><u>6.9%</u></b>	<b><u>7.6%</u></b>

### TOP TEN EXPOSURES – Actively Managed Equities vs S&P 1500

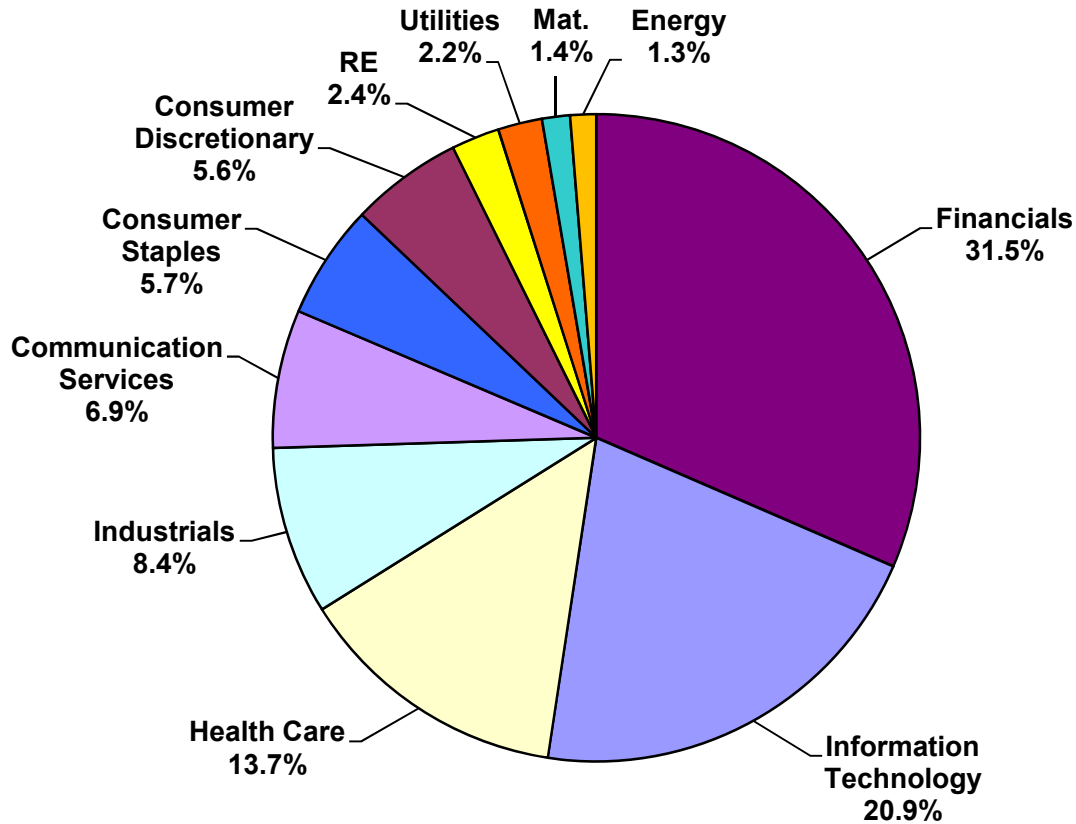
#### 9/30/19

<b><u>Actively Managed Equity Portfolio</u></b>			<b><u>S&amp;P 1500</u></b>		
<b><u>Company Name</u></b>	<b><u>Portfolio Weight</u></b>	<b><u>FY1 P/E</u></b>	<b><u>Company Name</u></b>	<b><u>Market Weight</u></b>	<b><u>FY1 P/E</u></b>
SPDR S&P 500 ETF Trust	22.2%	17.6	Microsoft Corp.	3.9%	25.8
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Berkshire Hathaway, Inc. B	4.3%	13.6	Amazon.com, Inc.	2.7%	72.2
AGNC Investment Corp.	3.7%	7.9	Facebook, Inc. Class A	1.6%	27.1
Wells Fargo & Company	2.1%	10.0	Berkshire Hathaway, Inc. B	1.5%	13.6
CVS Health Corp.	2.1%	8.7	JPMorgan Chase & Co.	1.4%	11.0
Microsoft Corp.	2.0%	25.8	Alphabet, Inc., Class C	1.4%	24.4
Gilead Sciences, Inc.	1.9%	8.8	Alphabet, Inc., Class A	1.3%	24.4
US Bancorp	1.7%	12.2	Johnson & Johnson	1.3%	15.3
Apple, Inc.	1.7%	19.2	Procter & Gamble Co.	1.1%	24.9
<b>TOTAL</b>	<b><u>49.4%</u></b>	<b><u>15.5</u></b>	<b>TOTAL</b>	<b><u>19.8%</u></b>	<b><u>21.7</u></b>

# SMRS

## Active Equity By Sector

### 9/30/19



Market Value in Millions				
9/30/19				
	Assets	Percent	Benchmark	Difference
Financials	\$3,140	31.5%	13.3%	18.2%
Information Technology	2,082	20.9%	21.3%	-0.4%
Health Care	1,364	13.7%	13.4%	0.3%
Industrials	836	8.4%	10.0%	-1.6%
Communication Services	687	6.9%	9.6%	-2.7%
Consumer Staples	565	5.7%	7.2%	-1.5%
Consumer Discretionary	562	5.6%	10.4%	-4.8%
Real Estate	239	2.4%	3.8%	-1.4%
Utilities	217	2.2%	3.6%	-1.4%
Materials	142	1.4%	3.0%	-1.6%
Energy	135	1.3%	4.4%	-3.1%
<b>Total</b>	<b>\$9,969</b>	<b>100.0%</b>	<b>100.0%</b>	

Benchmark: S&P 1500

**Manager Performance - Net of Fees**  
**9/30/19**

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
<b>SMRS S&amp;P 500 Index</b>	<b>\$6,286,249,496</b>	<b>4.2%</b>	<b>13.4%</b>	<b>10.9%</b>	<b>13.4%</b>	<b>--</b>	<b>N/A</b>
S&P 500		4.3%	13.4%	10.8%	13.3%	--	
Style & Risk Adjusted Benchmark		4.2%	13.4%	10.8%	13.2%	--	
Lipper Large-Cap Core		3.8%	12.4%	9.6%	12.2%	--	
<i>Excess Return</i>		<i>0.0%</i>	<i>0.0%</i>	<i>0.1%</i>	<i>0.2%</i>	<i>--</i>	
<i>Alpha</i>		<i>0.0%</i>	<i>0.1%</i>	<i>0.1%</i>	<i>0.2%</i>	<i>--</i>	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		<i>42</i>	<i>29</i>	<i>18</i>	<i>13</i>	<i>--</i>	
<b>SMRS Large-Cap Core</b>	<b>2,264,345,286</b>	<b>-3.9%</b>	<b>15.1%</b>	<b>9.1%</b>	<b>13.6%</b>	<b>8.4%</b>	<b>8/31/07</b>
S&P 500		4.3%	13.4%	10.8%	13.3%	8.3%	
Style & Risk Adjusted Benchmark		-2.7%	17.3%	12.4%	12.5%	9.0%	
Lipper Large-Cap Core		3.8%	12.4%	9.6%	12.2%	7.6%	
<i>Excess Return</i>		<i>-8.1%</i>	<i>1.7%</i>	<i>-1.7%</i>	<i>0.3%</i>	<i>0.1%</i>	
<i>Alpha</i>		<i>-1.2%</i>	<i>-2.2%</i>	<i>-3.2%</i>	<i>1.1%</i>	<i>-0.6%</i>	
<i>Pct Rank vs Lipper Large-Cap Core</i>		<i>98</i>	<i>7</i>	<i>66</i>	<i>12</i>	<i>24</i>	
<b>SMRS All-Cap Garp</b>	<b>1,676,858,417</b>	<b>0.3%</b>	<b>11.9%</b>	<b>8.3%</b>	<b>11.7%</b>	<b>12.5%</b>	<b>4/30/11</b>
S&P 1500 Super Composite		3.4%	13.0%	10.7%	13.1%	12.1%	
Style & Risk Adjusted Benchmark		4.5%	13.5%	10.8%	13.6%	12.4%	
Lipper Multi-Cap Core		1.6%	10.9%	8.2%	11.3%	9.9%	
<i>Excess Return</i>		<i>-3.1%</i>	<i>-1.1%</i>	<i>-2.3%</i>	<i>-1.5%</i>	<i>0.4%</i>	
<i>Alpha</i>		<i>-4.2%</i>	<i>-1.7%</i>	<i>-2.5%</i>	<i>-1.9%</i>	<i>0.1%</i>	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		<i>63</i>	<i>43</i>	<i>56</i>	<i>54</i>	<i>4</i>	
<b>Mellon US Equity Enhanced</b>	<b>1,018,125,700</b>	<b>23.7%</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>28.5%</b>	<b>3/1/17</b>
S&P 500		4.3%	--	--	--	12.0%	
Style & Risk Adjusted Benchmark		3.7%	--	--	--	19.6%	
Lipper Large-Cap Core		3.8%	--	--	--	10.6%	
<i>Excess Return</i>		<i>19.4%</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>16.9%</i>	
<i>Alpha</i>		<i>20.0%</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>8.9%</i>	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		<i>1</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>1</i>	
<b>SMRS Large-Cap Growth</b>	<b>690,212,147</b>	<b>0.7%</b>	<b>16.1%</b>	<b>11.5%</b>	<b>14.3%</b>	<b>10.1%</b>	<b>5/31/05</b>
S&P 500 Growth		3.2%	15.7%	12.8%	14.6%	10.3%	
Style & Risk Adjusted Benchmark		2.5%	17.1%	13.5%	15.7%	10.5%	
Lipper Large-Cap Growth		2.8%	15.5%	12.0%	13.9%	9.8%	
<i>Excess Return</i>		<i>-2.5%</i>	<i>0.3%</i>	<i>-1.3%</i>	<i>-0.3%</i>	<i>-0.3%</i>	
<i>Alpha</i>		<i>-1.8%</i>	<i>-1.0%</i>	<i>-2.1%</i>	<i>-1.4%</i>	<i>-0.5%</i>	
<i>Pct Rank vs Lipper Large-Cap Growth</i>		<i>73</i>	<i>44</i>	<i>64</i>	<i>43</i>	<i>41</i>	
<b>Fisher All-Cap</b>	<b>655,638,422</b>	<b>-0.1%</b>	<b>14.6%</b>	<b>11.7%</b>	<b>13.4%</b>	<b>10.8%</b>	<b>10/31/04</b>
S&P 1500		3.4%	13.0%	10.7%	13.1%	9.1%	
Style & Risk Adjusted Benchmark		4.3%	14.0%	11.6%	14.1%	10.9%	
Lipper Multi-Cap Core		1.6%	10.9%	8.2%	11.3%	7.9%	
<i>Excess Return</i>		<i>-3.5%</i>	<i>1.6%</i>	<i>1.0%</i>	<i>0.2%</i>	<i>1.7%</i>	
<i>Alpha</i>		<i>-4.3%</i>	<i>0.7%</i>	<i>0.1%</i>	<i>-0.7%</i>	<i>-0.1%</i>	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		<i>67</i>	<i>4</i>	<i>3</i>	<i>10</i>	<i>1</i>	
<b>LA Capital All-Cap Growth</b>	<b>632,052,183</b>	<b>6.1%</b>	<b>14.7%</b>	<b>13.6%</b>	<b>16.1%</b>	<b>12.0%</b>	<b>5/31/05</b>
S&P 1500 Growth		2.5%	15.2%	12.6%	14.4%	10.3%	
Style & Risk Adjusted Benchmark		2.5%	13.8%	10.8%	12.8%	9.4%	
Lipper Multi-Cap Growth		1.1%	14.2%	10.4%	12.9%	9.6%	
<i>Excess Return</i>		<i>3.6%</i>	<i>-0.5%</i>	<i>1.0%</i>	<i>1.7%</i>	<i>1.8%</i>	
<i>Alpha</i>		<i>3.6%</i>	<i>0.9%</i>	<i>2.9%</i>	<i>3.3%</i>	<i>2.6%</i>	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		<i>17</i>	<i>43</i>	<i>11</i>	<i>7</i>	<i>6</i>	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
<b>LA Capital Deep Value</b>	<b>619,185,211</b>	<b>0.3%</b>	<b>9.3%</b>	--	--	<b>7.0%</b>	<b>4/1/15</b>
S&P 1500 Value		4.5%	10.4%	--	--	8.3%	
Style & Risk Adjusted Benchmark		-2.1%	11.2%	--	--	8.8%	
Lipper Multi-Cap Value		-0.4%	8.5%	--	--	6.1%	
<i>Excess Return</i>		-4.2%	-1.0%	--	--	-1.3%	
<i>Alpha</i>		2.4%	-1.9%	--	--	-1.8%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		43	38	--	--	32	
<b>SMRS Mid-Cap Index</b>	<b>533,615,398</b>	<b>-2.5%</b>	<b>9.8%</b>	<b>9.4%</b>	<b>12.4%</b>	--	<b>N/A</b>
S&P 400		-2.5%	9.4%	8.9%	11.8%	--	
Style & Risk Adjusted Benchmark		-2.5%	9.3%	8.8%	11.7%	--	
Lipper Mid-Cap Core		-0.5%	8.7%	7.0%	10.6%	--	
<i>Excess Return</i>		0.0%	0.4%	0.6%	0.6%	--	
<i>Alpha</i>		-0.1%	0.5%	0.6%	0.6%	--	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		70	40	21	17	--	
<b>Seizert Capital Partners</b>	<b>543,300,822</b>	<b>-1.6%</b>	<b>10.1%</b>	<b>7.4%</b>	<b>11.8%</b>	<b>12.8%</b>	<b>11/30/09</b>
S&P 1500 Value		4.5%	10.4%	8.5%	11.6%	12.2%	
Style & Risk Adjusted Benchmark		-6.9%	10.1%	8.5%	11.6%	12.3%	
Lipper Multi-Cap Value		-0.4%	8.5%	6.5%	10.2%	10.6%	
<i>Excess Return</i>		-6.1%	-0.3%	-1.0%	0.2%	0.6%	
<i>Alpha</i>		5.3%	0.0%	-1.1%	0.2%	0.5%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		59	22	32	12	7	
<b>Large-Cap Consistent Growth</b>	<b>510,215,560</b>	<b>7.7%</b>	<b>18.6%</b>	--	--	<b>13.5%</b>	<b>3/1/15</b>
S&P 500		4.3%	13.4%	--	--	10.1%	
Style & Risk Adjusted Benchmark		3.2%	14.0%	--	--	10.6%	
Lipper Large-Cap Core		3.8%	12.4%	--	--	8.8%	
<i>Excess Return</i>		3.4%	5.2%	--	--	3.4%	
<i>Alpha</i>		4.5%	4.6%	--	--	2.8%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		14	1	--	--	1	
<b>Ark Investments</b>	<b>436,377,363</b>	<b>-10.9%</b>	<b>22.9%</b>	--	--	<b>26.6%</b>	<b>3/1/16</b>
S&P 1500 Growth		2.5%	15.2%	--	--	16.6%	
Style & Risk Adjusted Benchmark		-5.3%	27.5%	--	--	29.0%	
Lipper Multi-Cap Growth		1.1%	14.2%	--	--	15.6%	
<i>Excess Return</i>		-13.4%	7.7%	--	--	10.1%	
<i>Alpha</i>		-5.6%	-4.6%	--	--	-2.4%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		97	2	--	--	1	
<b>Clarkston Capital Large-Cap</b>	<b>281,353,475</b>	<b>11.8%</b>	<b>10.7%</b>	--	--	<b>9.9%</b>	<b>4/1/15</b>
S&P 500 Value		5.6%	10.6%	--	--	8.5%	
Style & Risk Adjusted Benchmark		-1.1%	8.6%	--	--	6.8%	
Lipper Large-Cap Value		2.5%	10.1%	--	--	7.7%	
<i>Excess Return</i>		6.2%	0.1%	--	--	1.4%	
<i>Alpha</i>		12.8%	2.1%	--	--	3.2%	
<i>Pct. Rank vs. Lipper Large-Cap Value</i>		1	36	--	--	3	
<b>Clarkston Capital Small/Mid-Cap</b>	<b>205,959,188</b>	<b>5.6%</b>	<b>9.2%</b>	<b>11.1%</b>	--	<b>10.8%</b>	<b>1/1/14</b>
S&P 400		-4.7%	9.4%	9.2%	--	8.1%	
Style & Risk Adjusted Benchmark		-0.8%	6.5%	6.6%	--	6.1%	
Lipper Mid-Cap Core		-0.5%	8.7%	7.0%	--	6.7%	
<i>Excess Return</i>		10.2%	-0.2%	1.9%	--	2.6%	
<i>Alpha</i>		6.4%	2.7%	4.5%	--	4.7%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		14	46	3	--	3	
<b>Attucks Asset Management</b>	<b>135,447,697</b>	<b>2.1%</b>	<b>10.4%</b>	<b>7.6%</b>	<b>10.7%</b>	<b>6.6%</b>	<b>11/30/07</b>
S&P 1500		3.4%	13.0%	10.7%	13.1%	8.0%	
Style & Risk Adjusted Benchmark		4.4%	9.5%	10.6%	13.2%	8.0%	
Lipper Multi-Cap Core		1.6%	10.9%	8.2%	11.3%	6.4%	
<i>Excess Return</i>		-1.2%	-2.6%	-3.1%	-2.4%	-1.4%	
<i>Alpha</i>		-2.2%	0.9%	-3.0%	-2.5%	-1.4%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		49	65	67	69	50	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
<b>Bivium Capital Partners</b>	<b>132,697,125</b>	<b>1.8%</b>	<b>10.4%</b>	<b>7.5%</b>	<b>10.1%</b>	<b>6.2%</b>	<b>11/30/07</b>
S&P 1500 Value		4.5%	10.4%	8.5%	11.6%	6.1%	
Style & Risk Adjusted Benchmark		4.6%	11.0%	8.8%	12.0%	8.3%	
Lipper Multi-Cap Value		-0.4%	8.5%	6.5%	10.2%	5.4%	
<i>Excess Return</i>		-2.7%	0.0%	-0.9%	-1.5%	0.1%	
<i>Alpha</i>		-2.8%	-0.7%	-1.3%	-1.9%	-2.0%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		31	16	30	58	26	
<b>Ancora</b>	<b>94,919,492</b>	<b>-6.0%</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>2.4%</b>	<b>10/1/17</b>
S&P 1000		-4.7%	--	--	--	5.0%	
Style & Risk Adjusted Benchmark		-6.7%	--	--	--	4.8%	
Lipper Mid-Cap Core		-0.5%	--	--	--	5.2%	
<i>Excess Return</i>		-1.3%	--	--	--	-2.6%	
<i>Alpha</i>		0.7%	--	--	--	-2.4%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		87	--	--	--	78	
<b>NorthPointe All-Cap Core</b>	<b>22,133,106</b>	<b>1.4%</b>	<b>7.3%</b>	<b>6.6%</b>	<b>9.8%</b>	<b>6.9%</b>	<b>10/31/04</b>
S&P 1500 Value		4.5%	10.4%	8.5%	11.6%	8.0%	
Style & Risk Adjusted Benchmark		4.1%	8.9%	7.6%	9.5%	9.6%	
Lipper Multi-Cap Value		-0.4%	8.5%	6.5%	10.2%	6.9%	
<i>Excess Return</i>		-3.1%	-3.1%	-1.8%	-1.9%	-1.1%	
<i>Alpha</i>		-2.7%	-1.7%	-0.9%	0.3%	-2.6%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		34	75	51	66	47	

State of Michigan Retirement System

# INTERNATIONAL EQUITY REVIEW

State of Michigan Investment Board Meeting

December 19, 2019



Patrick M. Moraniec, CFA  
Senior Investment Manager  
International Equity Division

## EXECUTIVE SUMMARY

### Performance

<b>MPSERS Plan (9/30/2019)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Annualized Returns	-1.1%	6.9%	4.1%	6.1%	5.5%
MSCI ACWI ex USA Returns	-1.2%	6.3%	2.9%	5.1%	4.4%
Peer Median Returns	-0.9%	7.0%	4.2%	6.4%	5.6%
Percentile Rank vs. Peers*	66	56	55	69	59

\*Source: State Street Universe greater than \$1 billion

- The International Equity Division (IED) portfolio outperformed the benchmark by 0.1% over the last twelve months. Outperformance from the energy sector, information technology sector, and quality factor was offset by underperformance in the utilities sector, value factor and low volatility factor.

### Asset Class Goals

- Construct a non-U.S. equity-focused portfolio to generate, on a consistent basis, ten-year returns that exceed the MSCI ACWI ex USA by 1.0%.
- Perform in the top half of the public plan peer universe percentile rankings.
- Advance people, processes, and systems to continuously improve investment decisions.

### Strategy

- The International Equity Division has three distinct portfolio strategies.
  - Active investments, 37.5% of assets, to gain specific international stock market exposures.
  - Stock plus investments, 37.0% of assets, to implement a portable alpha strategy onto high-level strategic tilts.
  - Index investments, 25.5% of assets, to gain broad international stock market exposure with minimal tracking risk.
- Current portfolio drivers of risk and return.
  - Tracking error of the portfolio is approximately 0.9% which is below the division's risk budget of 3.0%.
  - Emerging markets, the largest contributor to tracking error, accounts for only 13.0% of the total tracking error indicating the portfolio is not materially exposed to any one single risk.
  - Future portfolio returns will be driven by the performance of the quality factor, value factor, momentum factor, and emerging markets overweight.

- Quarterly changes to International Equity Division allocation.
  - Rebalanced \$935 million of maturing equity swaps to MSCI factor indexes maintaining the portfolio's exposure to the quality, value and momentum factors. The internal stock plus strategy has an estimated information ratio of 1.3.

## **Market Environment and Outlook**

- International stock markets rebounded in 2019, up 17.3% through the end of October. Developed markets are up 18.7% outperforming both the broader market as well as emerging markets which are up 13.2% this year.
- Last fall many feared a slowing Chinese economy would tip the world into a recession. Those fears continued into 2019 but China's manufacturing PMIs have stabilized and are now showing slight signs of expansion.
- The U.S. - China trade war escalated post the Japan G-20 summit. Despite the announcement of a phase one deal there is little evidence to indicate major progress on key issues such as unfair trade practices, intellectual property theft, and forced technology transfer. The timing of a complete trade deal remains unknown and this uncertainty will continue to negatively impact global trade.
- World trade volumes, a proxy for economic growth, continue to exhibit negative year-over-year growth. Trade volume growth over the last twelve months averaged 0.4% which is below the historical average of 3.5% over the last twenty years. On-going trade disputes between U.S., Europe and China may explain the subdued growth.
- Europe remains mired in slow growth. Sales per share continue to decline albeit at a slower pace indicating a bottoming process may be taking place. Europe manufacturing PMIs remain in contraction but are also exhibiting signs of a bottoming process.
- In early spring, IED indicated that the negative rate dynamic would box-in the European Central Bank (ECB) from raising rates in 2019 and potentially all of 2020 which was a non-consensus view. By June, the ECB confirmed rate hikes were off the table for 2019. By September, the ECB cut rates by 0.1% and restarted quantitative easing (QE). More importantly, the ECB noted that QE will remain in place until inflation picks up indicating no end date similar to the open-ended process in Japan.
- Interest rates have fallen precipitously across all government yield curves. Nine European countries still have negative yields on their ten-year bonds. The ECB's accommodative stance may help to provide a backstop to slowing of growth as the region stabilizes.
- Analysts continue to project positive earnings growth of about 12.0% over the next twelve months for the MSCI ACWI ex USA index. Multiples have expanded about 7.0% since June 2019 and investors are now paying a forward price-to-earnings of about 13.6x and trailing 15.2x. The trailing price-to-earnings has contracted approximately 15.0% since early 2018.



- The U.S. Dollar is flat year-to-date, up about 0.7%. Central banks around the world are now embarking on a cycle of easing monetary policy. If the U.S. Federal Reserve's monetary policy lags or is significantly less accommodative, the U.S. dollar may further strengthen, creating additional head winds for international stocks specifically the emerging markets. It is important to note the dollar remains range bound since December of 2014.
- Stock prices already reflect much of this slower economic reality and recently stronger U.S. dollar. The MSCI ACWI ex USA index trailing twelve-month normalized price-to-earnings ratio is 16.3 which is below the twenty-three year average of 21.9, implying return upside should earnings growth materialize.
- Go-forward annualized returns for the MSCI ACWI ex USA index are estimated at 9.1%. This rate is based on the current price and actual fundamentals over multiple periods to remove fundamental variability, better estimating the earnings power of the index.
- A ten-year blended international government yield of 1.2% implies an international equity risk premium of 7.8%. The equity risk premium increased primarily due to a rise in projected earnings that was offset by global government bond rates increasing 0.1% over the last quarter.

## **Conclusion**

International economic fundamentals continued to decline in the third quarter of 2019, however, global government bond yields and expected future earnings stabilized. Central banks around the world have begun an easing cycle to offset the continued weakness that began in January 2018. The policies in Japan and Europe are closer to an open-ended inflation targeting process which is strategically uncharted waters for European central bank policy. International stock markets trade at approximately a 25.0% discount relative to their twenty-three-year history and a wide spread to global risk-free rates. To capture this upside, international stock investors will need a long investment horizon as the short-term environment could experience increased volatility and a higher probability of a significant drawdown in equity markets should central bank policy not off-set continued macro-economic data weakness.

# SMRS

## International Equity Strategies

9/30/19

Markets	Amount	Total	% of Total
<b>Active</b> (\$ in Millions)			
BlackRock	\$1,914		
Wellington	990		
Los Angeles Capital Management	357		
Martin Currie	353		
Marathon-London	300		
Lazard	248		
SSGA	239		
Effissimo Capital Management	75		
<b>Total Active</b>		<b>\$4,477</b>	<b>37.5%</b>
<b>Stock Plus</b>			
Internal StocksPLUS	\$2,652		
PIMCO	1,752		
<b>Total Stock Plus</b>		<b>\$4,404</b>	<b>37.0%</b>
<b>Indexed</b>			
SSGA	\$1,730		
BlackRock	1,318		
<b>Total Indexed</b>		<b>\$3,048</b>	<b>25.5%</b>

**TOTAL**

**\$11,929**

**100.0%**

# SMRS

## International Equities

### 9/30/19

<b>Date:</b>	<b><u>9/30/19</u></b>	<b><u>6/30/19</u></b>	<b><u>3/31/19</u></b>	<b><u>12/31/18</u></b>
Assets (\$ in Millions):	\$11,929	\$12,131	\$12,264	\$11,084
Number of Securities:	2,711	2,705	2,636	2,646
Active Share:	32%	31%	26%	22%

Benchmark: MSCI ACWI ex USA

Description: The International Equities Composite represents all International Equity Division investments.

#### Portfolio Characteristics:

	<b>SMRS</b>		<b>MSCI ACWI ex USA</b>	
	<b><u>LTM</u></b>	<b><u>Normalized</u></b>	<b><u>LTM</u></b>	<b><u>Normalized</u></b>
<b>Return:</b>				
Annualized Total Return	9.6%	10.0%	8.6%	9.1%
Sustainable Growth Rate	5.7%	7.0%	5.0%	6.4%
Dividend Yield	2.8%	2.4%	3.0%	2.6%
Buyback Yield	0.6%	0.1%	0.7%	0.1%
Collateral Yield	0.5%	0.5%	0.0%	0.0%
<b>Risk:</b>				
Beta	1.01	--	1.00	--
Volatility	12.4%	--	12.2%	--
Tracking Error	0.9%	--	0.0%	--
Information Ratio	1.1	1.1	--	--
<b>Fundamental:</b>				
Average Capitalization (\$ in Billions)	68.3	--	64.4	--
Price/Earnings	14.5	15.4	15.0	16.3
Price/Book	1.6	1.8	1.7	1.8
ROE	11.4%	11.5%	11.0%	11.2%

#### TOP TEN HOLDINGS

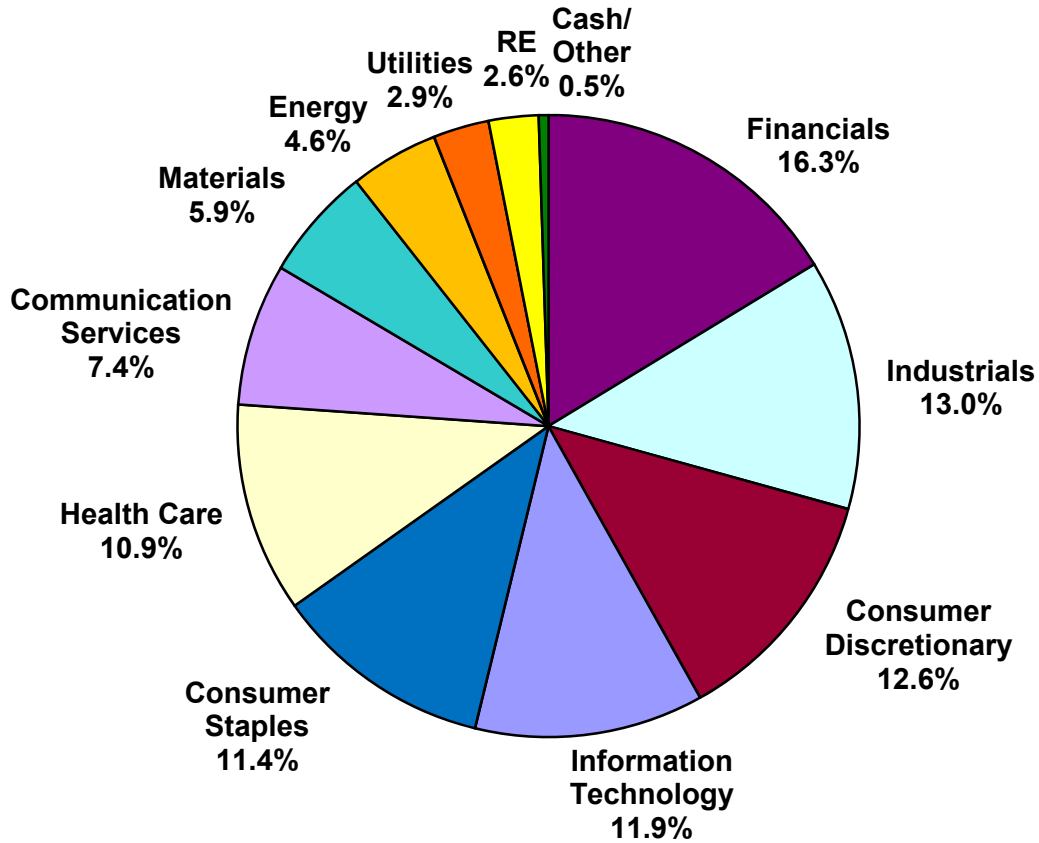
(\$ in Billions\* - \$ in Millions\*\*)

	<b><u>Portfolio Weight</u></b>	<b><u>Market Capitalization*</u></b>	<b><u>FY1 P/E</u></b>	<b><u>Market Value**</u></b>
Samsung Electronics Co., Ltd.	2.1%	\$272.0	15.5	\$247.4
Tencent Holdings Ltd.	2.0%	402.4	29.8	237.0
Roche Holding AG	1.7%	251.0	14.9	200.3
Taiwan Semiconductor Manufacturing Co., Ltd.	1.7%	227.3	21.3	197.8
Nestle S.A.	1.3%	323.2	24.5	155.0
Novartis AG	1.2%	219.3	17.1	145.6
Diageo PLC	0.9%	96.8	23.6	110.9
ASML Holding NV	0.9%	105.5	37.2	109.3
LVMH Moet Hennessy Louis Vuitton SE	0.9%	200.9	25.2	106.5
Toyota Motor Corp.	<u>0.8%</u>	<u>217.9</u>	9.2	<u>94.5</u>
<b>TOTAL</b>	<b><u>13.4%</u></b>	<b><u>\$2,316</u></b>		<b><u>\$1,604.4</u></b>

# SMRS

## International Equity By Sector

9/30/19



Market Value in Millions				
9/30/19				
	Assets	Percent	Benchmark	Difference
Financials	\$1,943	16.3%	21.4%	-5.1%
Industrials	1,545	13.0%	11.9%	1.1%
Consumer Discretionary	1,505	12.6%	11.2%	1.4%
Information Technology	1,422	11.9%	9.0%	2.9%
Consumer Staples	1,362	11.4%	10.2%	1.2%
Health Care	1,293	10.9%	8.6%	2.3%
Communication Services	883	7.4%	6.9%	0.5%
Materials	703	5.9%	7.3%	-1.4%
Energy	552	4.6%	6.7%	-2.1%
Utilities	345	2.9%	3.5%	-0.6%
Real Estate	314	2.6%	3.3%	-0.7%
<b>Total Investments</b>	<b>\$11,867</b>	<b>99.5%</b>	<b>100.0%</b>	
Cash/Other	62	0.5%	0.0%	0.5%
<b>Total</b>	<b>\$11,929</b>	<b>100.0%</b>	<b>100.0%</b>	

Benchmark: MSCI ACWI ex USA

**International Equity Performance - Net of Fees**  
9/30/19

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
<b>Total International Equity</b>	<b>\$11,928,702,045</b>	<b>-1.4%</b>	<b>6.6%</b>	<b>3.9%</b>	<b>5.9%</b>	<b>5.5%</b>	<b>1/1/04</b>
MSCI ACWI ex USA		-1.2%	6.3%	2.9%	5.1%	5.7%	
Lipper International Multi-Cap Core		-2.3%	5.4%	2.9%	5.5%	5.1%	
Excess Return		-0.2%	0.3%	1.0%	0.8%	-0.2%	
Pct Rank vs. Lipper International Multi-Cap Core		35	12	17	44	27	
<b>Total International Active Strategy</b>	<b>\$4,476,720,720</b>	<b>-3.4%</b>	<b>5.5%</b>	<b>3.3%</b>	<b>5.5%</b>	<b>4.6%</b>	<b>5/1/05</b>
MSCI ACWI ex USA		-1.2%	6.3%	2.9%	5.1%	5.0%	
Lipper International Multi-Cap Core		-2.3%	5.4%	2.9%	5.5%	4.4%	
Excess Return		-2.2%	-0.8%	0.4%	0.4%	-0.4%	
Pct Rank vs. Lipper International Multi-Cap Core		64	54	31	55	56	
<b>BlackRock MSCI Systematic Return</b>	<b>1,913,983,794</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>8.1%</b>	<b>12/1/18</b>
MSCI ACWI ex USA		--	--	--	--	6.5%	
Lipper International Multi-Cap Core		--	--	--	--	6.1%	
Excess Return		--	--	--	--	1.6%	
Pct Rank vs. Lipper International Multi-Cap Core		--	--	--	--	14	
<b>Wellington IRE</b>	<b>592,075,969</b>	<b>-1.5%</b>	<b>7.1%</b>	<b>3.7%</b>	<b>6.6%</b>	<b>4.4%</b>	<b>12/1/05</b>
MSCI World ex USA		-1.0%	6.5%	3.1%	5.8%	4.7%	
Lipper International Multi-Cap Core		-2.3%	5.4%	2.9%	5.5%	3.7%	
Excess Return		-0.4%	0.6%	0.7%	0.8%	-0.3%	
Pct Rank vs. Lipper International Multi-Cap Core		40	7	21	14	16	
<b>LACM Emerging Markets Fund</b>	<b>356,964,846</b>	<b>-4.2%</b>	<b>4.8%</b>	<b>2.1%</b>	<b>2.2%</b>	<b>3.5%</b>	<b>12/1/09</b>
MSCI Emerging Market Index		-2.0%	6.0%	2.3%	2.4%	3.0%	
Lipper Emerging Markets		0.2%	5.2%	1.6%	2.5%	3.2%	
Excess Return		-2.2%	-1.1%	-0.3%	-0.2%	0.5%	
Pct Rank vs. Lipper Emerging Markets		84	58	52	60	41	
<b>Martin Currie International Long-term Uncon:</b>	<b>352,646,223</b>	<b>2.6%</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>9.4%</b>	<b>2/1/17</b>
MSCI ACWI ex USA		-1.2%	--	--	--	6.3%	
Lipper International Multi-Cap Core		-2.3%	--	--	--	5.5%	
Excess Return		3.8%	--	--	--	3.1%	
Pct Rank vs. Lipper International Multi-Cap Core		9	--	--	--	1	
<b>Marathon-London International Fund</b>	<b>299,684,295</b>	<b>-3.8%</b>	<b>5.5%</b>	<b>4.5%</b>	<b>7.4%</b>	<b>7.6%</b>	<b>2/1/12</b>
MSCI World ex USA		-1.0%	6.5%	3.1%	5.8%	5.8%	
Lipper International Multi-Cap Core		-2.3%	5.4%	2.9%	5.5%	5.6%	
Excess Return		-2.7%	-1.0%	1.5%	1.6%	1.8%	
Pct Rank vs. Lipper International Multi-Cap Core		66	54	10	4	8	
<b>Wellington Emerging Markets Local Equity</b>	<b>278,392,217</b>	<b>3.5%</b>	<b>6.3%</b>	<b>3.5%</b>	<b>4.9%</b>	<b>5.9%</b>	<b>12/1/11</b>
MSCI Emerging Market Index		-2.0%	6.0%	2.3%	2.4%	3.5%	
Lipper Emerging Markets		0.2%	5.2%	1.6%	2.5%	3.4%	
Excess Return		5.5%	0.4%	1.1%	2.5%	2.5%	
Pct Rank vs. Lipper Emerging Markets		23	35	22	11	10	
<b>Lazard/Wilmington International Equity</b>	<b>247,950,000</b>	<b>0.5%</b>	<b>5.1%</b>	<b>3.0%</b>	<b>--</b>	<b>1.8%</b>	<b>6/1/14</b>
MSCI World ex USA		-1.0%	6.5%	3.1%	--	2.0%	
Lipper International Large-Cap Core		-2.3%	5.4%	2.9%	--	1.9%	
Excess Return		1.5%	-1.4%	-0.1%	--	-0.2%	
Pct Rank vs. Lipper International Large-Cap Core		17	65	48	--	60	
<b>SSGA International Alpha Small Cap</b>	<b>239,463,731</b>	<b>-7.0%</b>	<b>4.2%</b>	<b>4.4%</b>	<b>7.7%</b>	<b>3.2%</b>	<b>5/1/07</b>
MSCI World ex USA Small Cap		-5.6%	5.5%	5.1%	7.5%	2.8%	
Lipper International Small/Mid-Cap Core		-8.0%	3.8%	3.1%	5.9%	2.6%	
Excess Return		-1.4%	-1.4%	-0.8%	0.2%	0.4%	
Pct Rank vs. Lipper International Small/Mid-Cap Core		35	56	30	8	21	
<b>Wellington Select China Equity</b>	<b>118,447,680</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>-1.3%</b>	<b>9/1/19</b>
MSCI All China Index		--	--	--	--	0.4%	
Lipper Emerging Markets		--	--	--	--	1.6%	
Excess Return		--	--	--	--	-1.6%	
Pct Rand vs. Lipper Emerging Markets		--	--	--	--	98	
<b>Effissimo Capital Management Japan</b>	<b>75,052,674</b>	<b>-20.8%</b>	<b>3.8%</b>	<b>--</b>	<b>--</b>	<b>0.9%</b>	<b>12/1/15</b>
MSCI Japan		-4.7%	6.2%	--	--	5.6%	
Lipper International Small/Mid-Cap value		-6.9%	4.3%	--	--	5.2%	
Excess Return		-16.2%	-2.4%	--	--	-4.7%	
Pct Rank vs. Lipper International Small/Mid-Cap Value		100	56	--	--	89	

<b>Fund Name</b>	<b>Market Value</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>Inception</b>	<b>Inception Date</b>
<b>Total International Stock Plus Strategy</b>	<b>\$4,404,400,448</b>	<b>0.7%</b>	<b>7.7%</b>	<b>4.5%</b>	<b>6.6%</b>	<b>7.1%</b>	<b>1/1/09</b>
MSCI ACWI ex USA		-1.2%	6.3%	2.9%	5.1%	7.2%	
Lipper International Multi-Cap Core		-2.3%	5.4%	2.9%	5.5%	6.9%	
<i>Excess Return</i>		1.9%	1.4%	1.5%	1.5%	-0.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		15	6	11	12	31	
<b>Internal Stock Plus</b>	<b>2,652,522,703</b>	<b>3.0%</b>	<b>7.0%</b>	<b>4.3%</b>	<b>7.3%</b>	<b>5.4%</b>	<b>9/1/11</b>
MSCI ACWI ex USA		-1.2%	6.3%	2.9%	5.1%	4.5%	
Lipper International Multi-Cap Core		-2.3%	5.4%	2.9%	5.5%	5.0%	
<i>Excess Return</i>		4.3%	0.7%	1.4%	2.2%	0.8%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		8	9	12	5	37	
<b>PIMCO StocksPLUS</b>	<b>1,751,877,745</b>	--	--	--	--	<b>1.1%</b>	<b>4/1/19</b>
MSCI ACWI ex USA		--	--	--	--	1.1%	
Lipper International Multi-Cap Core		--	--	--	--	1.6%	
<i>Excess Return</i>		--	--	--	--	0.0%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		--	--	--	--	62	

<b>Total International Index Strategy</b>	<b>\$3,047,585,721</b>	<b>-1.2%</b>	<b>7.3%</b>	<b>4.5%</b>	<b>5.8%</b>	<b>7.4%</b>	<b>7/1/09</b>
MSCI ACWI ex USA		-1.2%	6.3%	2.9%	5.1%	6.2%	
Lipper International Multi-Cap Core		-2.3%	5.4%	2.9%	5.5%	6.3%	
<i>Excess Return</i>		0.1%	1.0%	1.6%	0.7%	1.2%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		35	7	10	45	14	
<b>SSGA MSCI ACWI EX USA INDEX</b>	<b>1,729,343,871</b>	<b>-1.4%</b>	--	--	--	<b>-0.6%</b>	<b>11/1/17</b>
MSCI ACWI ex USA		-1.2%	--	--	--	-0.7%	
Lipper International Multi-Cap Core		-2.3%	--	--	--	-1.2%	
<i>Excess Return</i>		-0.1%	--	--	--	0.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		39	--	--	--	41	
<b>Blackrock ACWI ex USA Index</b>	<b>1,318,241,850</b>	<b>-1.0%</b>	--	--	--	<b>-2.8%</b>	<b>3/1/18</b>
MSCI ACWI ex USA		-1.2%	--	--	--	-3.1%	
Lipper International Multi-Cap Core		-2.3%	--	--	--	-2.7%	
<i>Excess Return</i>		0.2%	--	--	--	0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		28	--	--	--	54	

State of Michigan Retirement System

# DEFINED CONTRIBUTION REVIEW

State of Michigan Investment Board Meeting  
December 19, 2019



Woodrow S. Tyler  
Senior Investment Manager  
Defined Contribution, Trusts & Agencies Division

# EXECUTIVE SUMMARY

## Overview

Defined Contribution (DC) plans are participant led investments. The role of the Bureau of Investments is to offer a sufficient range of investment options to allow the participants to diversify their individual retirement accounts and construct portfolios that reasonably span the risk/return spectrum. To this end, the Plans may be comprised of at least one investment option from the categories below.

## Investment Options

### **Tier I: Target Date Funds and Passively Managed Index Funds**

- Target Date Funds (TDFs) are the default option for plan participants. Each TDF seeks to achieve its objective by investing in a set of underlying index funds representing various asset classes. Over time, the allocation to asset classes and funds changes according to a predetermined "glide path" and will become more conservative as it approaches the target retirement date.
- Passively Managed Index Funds are comprised of low-cost index funds which seek to replicate the performance of a variety of cash, bond and stock indices with very little tracking error and at a low fee.

### **Tier II: Actively Managed Funds**

- These are funds actively managed by investment managers in an attempt to outperform various cash, bond and stock indices over long periods of time.

### **Tier III: Self Directed Brokerage Account – Non-Core Options**

- TD Ameritrade provides access to a broad range of investment choices including individual stocks, bonds, CDs, over 100 commission-free ETFs, and more than 13,000 mutual funds—including more than 2,100 no-load, no-transaction-fee (NTF) mutual funds.

## Michigan DC Plan Ecosystem Study

- State Street Global Advisors, the State's TDF Provider, recently conducted an ecosystem study on the State's DC plan. The analysis included active Michigan Public School Employees (MPSERS) and State Employees (SERS). The table below gives a snapshot of each Plan's characteristics as of April 2019:

	SERS	MPSERS	Total
Plan Assets	\$8.1B	\$0.75B	<b>\$8.8B</b>
Plan Participants (Active Only)	75,967 (48,935)	103,232 (92,915)	<b>179,200 (141,850)</b>
Plan Participation Rate	91.8%	99%	<b>96.5%</b>
Median DC Balance	\$56,322	\$6,348	<b>\$13,503</b>
Median Savings Rate	14%	10%	<b>10%</b>

Source: SSGA. State Street analysis based on information provided by plan sponsor, as of April 2019. SERS plan launched in 1997. MPSERS plan launched in 2012. Automatic plan enrollment implemented in 2012.

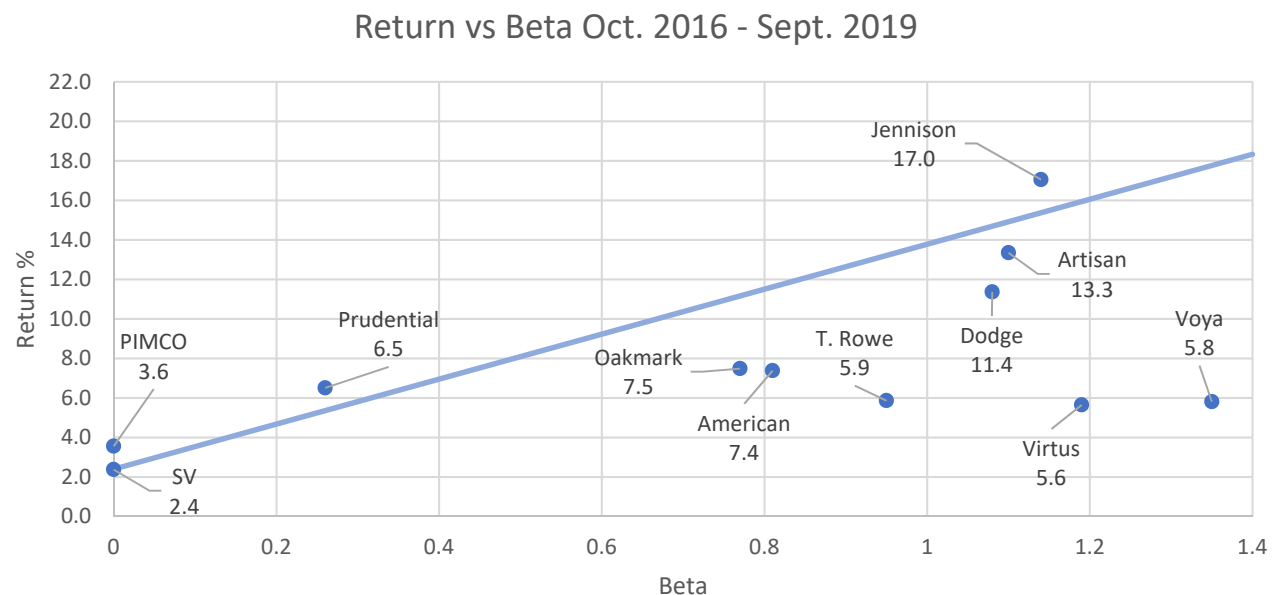


- The analysis provided the following conclusions:
  - Contribution rates of ~9.8% are healthy and above industry average.
  - Plan assets are concentrated with older participants in the SERS plan who are primarily invested in core funds with large equity exposure.
  - MPSERS has more participants and they tend to be younger and relatively new to the plan.
  - There are meaningful differences in asset allocations between participants in the two plans; MPSERS participants are more likely to invest in TDFs while SERS participants are more likely to invest in equities.

## **Investment Selection**

- The selection of each investment option for the Plans is based on the prudence standards set by the Governing Documents and applicable law, with flexibility built-in to allow an investment manager search to take full advantage of strategic opportunities. The search will focus on finding opportunities which are tailored to the Plans' specific needs. The BOI, in consultation with the Office of Retirement Services (ORS), will establish search criteria which aligns with the purpose and objective an investment option is seeking to attain. Due diligence will be completed with the goal of selecting a plan that, in the totality of circumstances, offers fair and reasonable investment options for the Plan participants.
- With respect to Tier III investments, the universe of available options is extensive. Since the selection of investments is directed solely by the participants which elect the Tier III option, the State does not provide any criteria for selecting or monitoring these non-core investment options.

## **Current Line-Up**



## **Market Environment and Outlook**

- SECURE Act - Setting Every Community Up for Retirement
  - Repeal of maximum age for traditional IRA contributions (currently 70½ ).
  - Disclosure regarding lifetime income - require that benefit statements provided to DC participants include a lifetime income disclosure at least once during any 12-month period.
  - Allow long-term/part-time workers to participate in 401(k) plans.
  - Increase age for required date for mandatory distributions (from 70½ to 72).
  - Fiduciary safe harbor for selection of lifetime income provider- fiduciaries are afforded an optional safe harbor to satisfy the prudence requirement with respect to the selection of insurers for a guaranteed retirement income contract and are protected from liability for any losses that may result to the participant due to an insurer's inability in the future to satisfy its financial obligations under the terms of the contract.
  - Simplify safe harbor 401(k) rules- eliminate notice requirements.
- The House of Representatives passed the SECURE Act by a near unanimous 417-3 vote in May. However, the retirement reform bill currently remains stalled in the Senate.
- TD Ameritrade announced on Oct. 3 that they were moving to commission-free online trading of equity securities for 401(k) and 457(b) participants with self-directed brokerage accounts.
- Another trend in the industry is the focus on retirement income. As fewer individuals have access to pension plans and DC plans have become the primary retirement vehicle for many Americans, more plan sponsors are exploring the ability to generate sustainable income in retirement.

# SMRS

## Defined Contribution Strategies

### 9/30/19

Markets	Amount		% of Total	Fee per \$1,000
QDIA (\$ in Millions)				
	9/30/2019	9/30/2018		
Total Target Date Fund	\$1,909	\$1,565	21.3%	\$0.70
Tier I Index Funds				
State Street S&P 500 Index Fund	\$1,229	\$1,205		\$0.10
State Street Bond Market Index Fund	841	708		0.20
State Street Global All Cap Equity ex-US Index Fund	619	564		0.50
State Street S&P Mid Cap Index Fund	578	607		0.20
BlackRock Government Short-Term Investment CL F	229	225		0.60
BlackRock S&P Small Cap 600 Equity Index CL F	131	160		0.30
BlackRock Emerging Markets Index CL F	119	123		0.70
Total Tier I Index	\$3,745	\$3,593	41.9%	\$0.26
Tier II Active Funds				
Stable Value Fund	\$1,160	\$1,142		\$2.20
Dodge & Cox Stock Fund	554	625		4.10
Jennison Large Cap Growth Fund	382	420		2.90
American Funds EuroPacific Growth R6	303	345		4.90
Voya Small Cap Growth Equity Fund	139	177		4.30
Artisan Mid Cap Fund	119	105		7.00
PIMCO Total Return I Fund	118	113		7.10
Oakmark Equity & Income I Fund	113	120		4.30
T. Rowe Price Mid-Cap Value Fund	112	130		6.30
Virtus Ceredex Small-Cap Value Eq I	71	84		6.80
Prudential High Yield Fund	35	26		3.80
Total Tier II Active	\$3,107	\$3,286	34.7%	\$3.70
Tier III				
Total Self Directed Brokerage Account	\$186	\$203	2.1%	NA

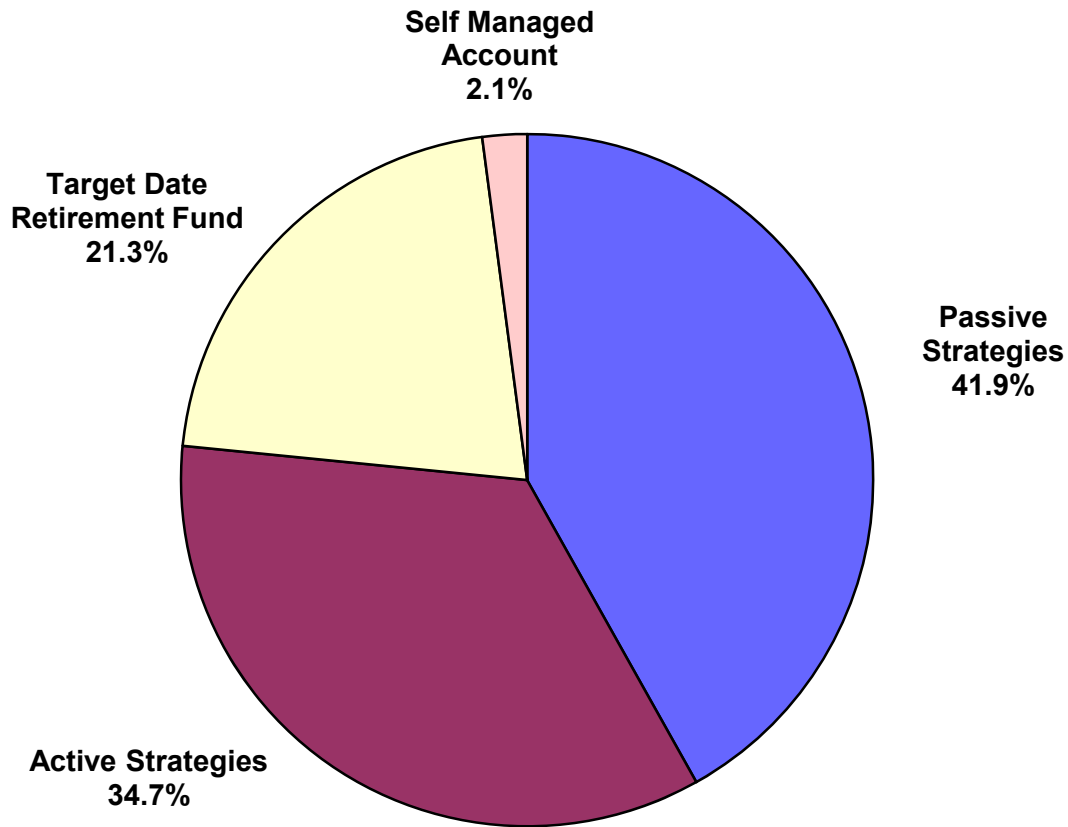
<b>Total Defined Contribution Assets</b>	<b>\$8,947</b>	<b>\$8,647</b>	<b>100.0%</b>	<b>\$1.54</b>
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NOTE: Totals may not be exact due to rounding.

# SMRS

## Defined Contribution by Investment Strategy

### 9/30/19



Market Value in Millions				
	9/30/19		9/30/18	
Passive Strategies	\$3,745	41.9%	\$3,593	41.6%
Active Strategies	3,107	34.7%	3,286	38.0%
Target Date Retirement Fund	1,909	21.3%	1,565	18.1%
Self Managed Account	186	2.1%	203	2.3%
<b>Total Investments</b>	<b>\$8,947</b>	<b>100.0%</b>	<b>\$8,647</b>	<b>100.0%</b>

\*Loan Fund \$207M as of 9/30/19

## Defined Contribution Performance by Fund

### 9/30/19

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
<b>State Street Target Retirement Income Fund</b>	<b>\$40,944,777</b>	<b>5.5%</b>	<b>4.8%</b>	<b>3.9%</b>	<b>5.4%</b>
State Street Income Custom Index		5.5%	4.8%	4.0%	5.5%
Morningstar Target-Date Retirement		5.9%	4.7%	3.9%	5.1%
Variance State Street Income Custom Index		0.0%	0.0%	-0.1%	-0.1%
Variance Morningstar Target-Date Retirement		-0.4%	0.1%	0.0%	0.3%
<b>State Street Target Retirement 2015 Fund</b>	<b>55,376,590</b>	<b>5.4%</b>	<b>5.3%</b>	<b>4.4%</b>	<b>7.1%</b>
State Street 2015 Custom Index		5.4%	5.3%	4.4%	7.2%
Morningstar Target-Date 2015		5.2%	5.8%	4.7%	6.2%
Variance State Street 2015 Custom Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Target-Date 2015		0.2%	-0.5%	-0.3%	0.9%
<b>State Street Target Retirement 2020 Fund</b>	<b>132,323,964</b>	<b>5.3%</b>	<b>6.5%</b>	<b>5.3%</b>	<b>8.1%</b>
State Street 2020 Custom Index		5.2%	6.4%	5.3%	8.1%
Morningstar Target-Date 2020		5.0%	6.1%	4.9%	6.6%
Variance State Street 2020 Custom Index		0.1%	0.1%	0.0%	0.0%
Variance Morningstar Target-Date 2020		0.3%	0.4%	0.4%	1.5%
<b>State Street Target Retirement 2025 Fund</b>	<b>186,001,704</b>	<b>4.9%</b>	<b>7.6%</b>	<b>6.1%</b>	<b>8.8%</b>
State Street 2025 Custom Index		4.8%	7.6%	6.1%	8.8%
Morningstar Target-Date 2025		4.5%	7.0%	5.5%	7.4%
Variance State Street 2025 Custom Index		0.1%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2025		0.4%	0.6%	0.6%	1.4%
<b>State Street Target Retirement 2030 Fund</b>	<b>206,913,034</b>	<b>4.6%</b>	<b>8.2%</b>	<b>6.4%</b>	<b>9.2%</b>
State Street 2030 Custom Index		4.5%	8.1%	6.4%	9.2%
Morningstar Target-Date 2030		3.8%	7.6%	5.9%	7.7%
Variance State Street 2030 Custom Index		0.1%	0.1%	0.0%	0.0%
Variance Morningstar Target-Date 2030		0.8%	0.6%	0.5%	1.5%
<b>State Street Target Retirement 2035 Fund</b>	<b>226,398,065</b>	<b>3.9%</b>	<b>8.6%</b>	<b>6.7%</b>	<b>9.3%</b>
State Street 2035 Custom Index		3.9%	8.6%	6.7%	9.4%
Morningstar Target-Date 2035		3.1%	8.3%	6.3%	8.4%
Variance State Street 2035 Custom Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Target-Date 2035		0.8%	0.3%	0.4%	0.9%
<b>State Street Target Retirement 2040 Fund</b>	<b>221,462,717</b>	<b>3.3%</b>	<b>8.9%</b>	<b>6.8%</b>	<b>9.4%</b>
State Street 2040 Custom Index		3.3%	8.9%	6.8%	9.5%
Morningstar Target-Date 2040		2.4%	8.5%	6.4%	8.3%
Variance State Street 2040 Custom Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Target-Date 2040		0.9%	0.4%	0.4%	1.1%
<b>State Street Target Retirement 2045 Fund</b>	<b>224,825,432</b>	<b>2.6%</b>	<b>9.1%</b>	<b>7.0%</b>	<b>9.5%</b>
State Street 2045 Custom Index		2.6%	9.1%	7.0%	9.6%
Morningstar Target-Date 2045		2.1%	8.9%	6.7%	8.8%
Variance State Street 2045 Custom Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Target-Date 2045		0.5%	0.2%	0.3%	0.7%
<b>State Street Target Retirement 2050 Fund</b>	<b>279,229,421</b>	<b>2.5%</b>	<b>9.1%</b>	<b>7.0%</b>	<b>9.5%</b>
State Street 2050 Custom Index		2.5%	9.0%	6.9%	9.6%
Morningstar Target-Date 2050		1.9%	8.8%	6.7%	8.6%
Variance State Street 2050 Custom Index		0.0%	0.1%	0.1%	-0.1%
Variance Morningstar Target-Date 2050		0.6%	0.3%	0.3%	0.9%
<b>State Street Target Retirement 2055 Fund</b>	<b>267,771,962</b>	<b>2.6%</b>	<b>9.1%</b>	<b>7.0%</b>	<b>N/A</b>
State Street 2055 Custom Index		2.5%	9.0%	6.9%	N/A
Morningstar Target-Date 2055		1.8%	9.1%	6.8%	N/A
Variance State Street 2055 Custom Index		0.1%	0.1%	0.1%	N/A
Variance Morningstar Target-Date 2055		0.8%	0.0%	0.2%	N/A

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
<b>State Street Target Retirement 2060 Fund</b>	<b>\$67,971,224</b>	<b>2.5%</b>	<b>9.1%</b>	<b>N/A</b>	<b>N/A</b>
<i>State Street 2060 Custom Index</i>		2.5%	9.0%	N/A	N/A
<i>Morningstar Target-Date 2060+</i>		1.7%	9.2%	N/A	N/A
<i>Variance State Street 2060 Custom Index</i>		0.0%	0.1%	N/A	N/A
<i>Variance Morningstar Target-Date 2060+</i>		0.8%	-0.1%	N/A	N/A
<b>TIER I</b>					
<b>State Street S&amp;P 500 Index Fund</b>	<b>1,228,694,301</b>	<b>4.2%</b>	<b>13.4%</b>	<b>10.8%</b>	<b>13.2%</b>
S&P 500 Index		4.3%	13.4%	10.8%	13.2%
Morningstar Large Blend		2.8%	11.7%	8.7%	11.2%
Variance S&P 500 Index		-0.1%	0.0%	0.0%	0.0%
Variance Morningstar Large Blend		1.4%	1.7%	2.1%	2.0%
<b>State Street Bond Market Index Fund</b>	<b>841,354,272</b>	<b>10.3%</b>	<b>2.9%</b>	<b>3.4%</b>	<b>3.7%</b>
Bloomberg Barclays U.S. Aggregate Index		10.3%	2.9%	3.4%	3.7%
Morningstar Intermediate-Term Bond		9.1%	2.9%	3.1%	3.9%
Variance Bloomberg Barclays U.S. Aggregate Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Intermediate-Term Bond		1.2%	0.0%	0.3%	-0.2%
<b>State Street S&amp;P Mid Cap Index Fund</b>	<b>618,530,603</b>	<b>-1.6%</b>	<b>6.3%</b>	<b>3.3%</b>	<b>N/A</b>
S&P 400 Index		-1.8%	6.1%	3.0%	N/A
Morningstar Mid-Cap Blend		-2.1%	5.5%	2.8%	N/A
Variance S&P 400 Index		0.2%	0.2%	0.3%	N/A
<i>Variance Morningstar Mid-Cap Blend</i>		0.5%	0.8%	0.5%	N/A
<b>State Street Global All Cap Equity ex-U.S. Index Fund</b>	<b>578,465,155</b>	<b>-2.5%</b>	<b>9.3%</b>	<b>8.8%</b>	<b>12.5%</b>
MSCI ACWI ex USA IMI (Net)		-2.5%	9.4%	8.9%	12.6%
Morningstar Foreign Large Blend		-1.5%	8.4%	6.5%	10.5%
Variance MSCI ACWI ex USA IMI (Net)		0.0%	-0.1%	-0.1%	-0.1%
Variance Morningstar Foreign Large Blend		-1.0%	0.9%	2.3%	2.0%
<b>BlackRock Government Short-Term Investment CL F</b>	<b>228,667,384</b>	<b>2.3%</b>	<b>1.5%</b>	<b>1.0%</b>	<b>N/A</b>
BofA Merrill Lynch US 3-Month Treasury Bill Index		2.4%	1.5%	1.0%	N/A
Variance BofA Merrill Lynch US 3-Month Treasury Bill Index		-0.1%	0.0%	0.0%	N/A
<b>BlackRock S&amp;P Small Cap 600 Equity Index CL F</b>	<b>130,699,784</b>	<b>-9.3%</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
S&P SmallCap 600 Index		-9.3%	N/A	N/A	N/A
Morningstar Small Blend		-7.8%	N/A	N/A	N/A
Variance S&P SmallCap 600 Index		0.0%	N/A	N/A	N/A
Variance Morningstar Small Blend		-1.5%	N/A	N/A	N/A
<b>BlackRock Emerging Markets Index CL F</b>	<b>118,968,175</b>	<b>-2.0%</b>	<b>5.9%</b>	<b>2.3%</b>	<b>N/A</b>
MSCI Emerging Market (Net)		-2.0%	6.0%	2.3%	N/A
Morningstar Diversified Emerging Mkts		-0.1%	4.9%	1.5%	N/A
Variance MSCI Emerging Market (Net)		0.0%	-0.1%	0.0%	N/A
<i>Variance Morningstar Diversified Emerging Mkts</i>		-1.9%	1.0%	0.8%	N/A
<b>TIER II</b>					
<b>Stable Value Fund</b>	<b>1,160,116,382</b>	<b>2.7%</b>	<b>2.4%</b>	<b>2.3%</b>	<b>2.3%</b>
Barclays Int Gov/Credit A or Higher Index		7.8%	2.1%	2.4%	2.7%
Hueler Universe		2.5%	2.2%	2.0%	2.2%
Variance Barclays Int Gov/Credit A or Higher Index		-5.1%	0.3%	-0.1%	-0.4%
Variance Hueler Universe		0.2%	0.2%	0.3%	0.1%
<b>Dodge &amp; Cox Stock Fund</b>	<b>554,128,347</b>	<b>-1.9%</b>	<b>11.4%</b>	<b>8.1%</b>	<b>12.0%</b>
<i>Russell 1000 Value Index</i>		4.0%	9.4%	7.8%	11.5%
<i>Morningstar Large Value</i>		1.8%	9.5%	7.1%	10.2%
<i>Variance Russell 1000 Value Index</i>		-5.9%	2.0%	0.3%	0.5%
<i>Variance Morningstar Large Value</i>		-3.7%	1.9%	1.0%	1.8%

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
<b>Jennison Large Cap Growth Fund</b>	<b>\$381,984,783</b>	<b>-1.6%</b>	<b>17.0%</b>	<b>13.6%</b>	<b>N/A</b>
<i>Russell 1000 Growth Index</i>		3.7%	16.9%	13.4%	N/A
<i>Morningstar Large Growth</i>		1.9%	14.5%	10.9%	N/A
<i>Variance Russell 1000 Growth Index</i>		-5.3%	0.1%	0.2%	N/A
<i>Variance Morningstar Large Growth</i>		-3.5%	2.5%	2.7%	N/A
<b>American Funds EuroPacific Growth R6</b>	<b>303,304,527</b>	<b>1.1%</b>	<b>7.4%</b>	<b>5.0%</b>	<b>6.1%</b>
<i>MSCI EAFE Index - Net Div</i>		-1.3%	6.5%	3.3%	4.9%
<i>Morningstar Foreign Large Blend</i>		-2.1%	5.5%	2.8%	4.5%
<i>Variance MSCI EAFE Index - Net Div</i>		2.4%	0.9%	1.7%	1.2%
<i>Variance Morningstar Foreign Large Blend</i>		3.2%	1.9%	2.2%	1.6%
<b>Voya Small Cap Growth Equity Fund</b>	<b>139,292,431</b>	<b>-11.6%</b>	<b>5.8%</b>	<b>7.2%</b>	<b>N/A</b>
<i>Russell 2000 Growth Index</i>		-9.6%	9.8%	9.1%	N/A
<i>Morningstar Small Growth</i>		-7.6%	11.3%	9.3%	N/A
<i>Variance Russell 2000 Growth Index</i>		-2.0%	-4.0%	-1.9%	N/A
<i>Variance Morningstar Small Growth</i>		-4.0%	-5.5%	-2.1%	N/A
<b>Artisan Mid Cap Fund</b>	<b>118,664,232</b>	<b>-5.0%</b>	<b>6.0%</b>	<b>6.8%</b>	<b>10.5%</b>
<i>Russell Midcap Growth Index</i>		1.6%	7.8%	7.6%	12.3%
<i>Morningstar Mid-Cap Growth</i>		-1.9%	7.1%	6.2%	10.5%
<i>Variance Russell Midcap Growth Index</i>		-6.6%	-1.8%	-0.8%	-1.8%
<i>Variance Morningstar Mid-Cap Growth</i>		-3.1%	-1.1%	0.6%	0.0%
<b>PIMCO Total Return I Fund</b>	<b>118,300,293</b>	<b>2.6%</b>	<b>7.8%</b>	<b>5.7%</b>	<b>7.9%</b>
<i>Bloomberg Barclays U.S. Aggregate Index</i>		7.5%	9.4%	8.1%	9.7%
<i>Morningstar Intermediate Core-Plus Bond</i>		3.4%	6.8%	5.3%	7.3%
<i>Variance Bloomberg Barclays U.S. Aggregate Index</i>		-4.9%	-1.6%	-2.4%	-1.8%
<i>Variance Morningstar Intermediate Core-Plus Bond</i>		-0.8%	1.0%	0.4%	0.6%
<b>Oakmark Equity &amp; Income I Fund</b>	<b>113,294,664</b>	<b>5.8%</b>	<b>13.3%</b>	<b>10.3%</b>	<b>13.9%</b>
<i>60% S&amp;P 500/40% Barclays U.S. Gov/Credit Index</i>		5.2%	14.5%	11.1%	14.1%
<i>Morningstar Allocation--50% to 70% Equity</i>		0.9%	12.8%	9.4%	11.9%
<i>Variance 60% S&amp;P 500/40% Barclays U.S. Gov/Credit Index</i>		0.6%	-1.2%	-0.8%	-0.2%
<i>Variance Morningstar Allocation--50% to 70% Equity</i>		4.9%	0.5%	0.9%	2.0%
<b>T. Rowe Price Mid-Cap Value Fund</b>	<b>111,763,740</b>	<b>10.1%</b>	<b>3.6%</b>	<b>3.6%</b>	<b>4.3%</b>
<i>Russell Midcap Value Index</i>		10.3%	2.9%	3.4%	3.7%
<i>Morningstar Mid-Cap Value</i>		9.2%	3.2%	3.3%	4.4%
<i>Variance Russell Midcap Value Index</i>		-0.2%	0.7%	0.2%	0.6%
<i>Variance Morningstar Mid-Cap Value</i>		0.9%	0.4%	0.3%	-0.1%
<b>Virtus Ceredex Small-Cap Value Eq I</b>	<b>70,805,317</b>	<b>-4.3%</b>	<b>6.2%</b>	<b>8.7%</b>	<b>11.2%</b>
<i>Russell 2000 Value Index</i>		-8.2%	6.5%	7.2%	10.1%
<i>Morningstar Small Value</i>		-9.3%	5.2%	5.2%	9.5%
<i>Variance Russell 2000 Value Index</i>		3.9%	-0.3%	1.5%	1.1%
<i>Variance Morningstar Small Value</i>		5.0%	1.0%	3.5%	1.7%
<b>Prudential High Yield Fund</b>	<b>34,865,027</b>	<b>8.8%</b>	<b>6.5%</b>	<b>6.1%</b>	<b>N/A</b>
<i>Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		6.2%	6.0%	5.3%	N/A
<i>Morningstar High Yield Bond</i>		5.2%	5.0%	4.0%	N/A
<i>Variance Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		2.6%	0.5%	0.8%	N/A
<i>Variance Morningstar High Yield Bond</i>		3.6%	1.5%	2.1%	N/A
<b>TIER III</b>					
<b>Self Directed</b>	<b>185,943,667</b>				
<b>TOTAL</b>	<b>\$8,947,061,974</b>				

Loan Fund: \$206,871,765

State of Michigan Retirement System

# PRIVATE EQUITY REVIEW

State of Michigan Investment Board Meeting  
December 19, 2019



Peter A. Woodford  
Senior Investment Manager  
Private Equity Division



## EXECUTIVE SUMMARY

### Performance

<b>MPSERS Plan (9/30/19)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Annualized Returns	11.2%	15.6%	12.3%	14.5%	15.4%
PE Benchmark Returns	13.7%	17.6%	14.0%	17.4%	18.1%
Peer Median Returns	7.2%	9.6%	8.5%	10.0%	10.3%
Percentile Rank vs. Peers*	14	11	13	11	13

\*State Street Universe greater than \$1 billion

- Private Equity returns have been strong relative to peer median returns, ranking in the top 13% of peers over the past ten years. Outperformance to peers is attributable to fund selectivity and strategy.
- It is not unusual for private equity returns to lag the public benchmark returns during periods of expansion and lead the public benchmark during periods of contraction. The past ten years have been no exception due to the longest expansion in U.S. history. Over this period, the Private Equity Division has outperformed the S&P by 220 basis points (ten-year S&P 500 return 13.2%) but underperformed the benchmark by 2.7%.
- For the twelve months ending September 30, 2019, the Private Equity Division made contributions of approximately \$680 million, net of distributions. Although the pace of distributions continues to slow, distribution activity should remain healthy for as long as the economic expansion continues with General Partners incentivized to exit investments at current valuations.
- Commitments closed during the quarter include:
  - \$150 million to Apax X USD, LP, a buyout fund focused on the middle-market
  - \$100 million to Veritas Capital Fund VII, LP, a buyout fund focused on the middle-market
  - \$25 million to Lightspeed Opportunity Fund, LP, a late stage venture/growth fund
  - \$25 million to Science Ventures Fund III, LP, an early stage technology venture fund
  - \$15 million to Riverside Microcap Fund IV B, LP, a lower middle-market supplemental fund

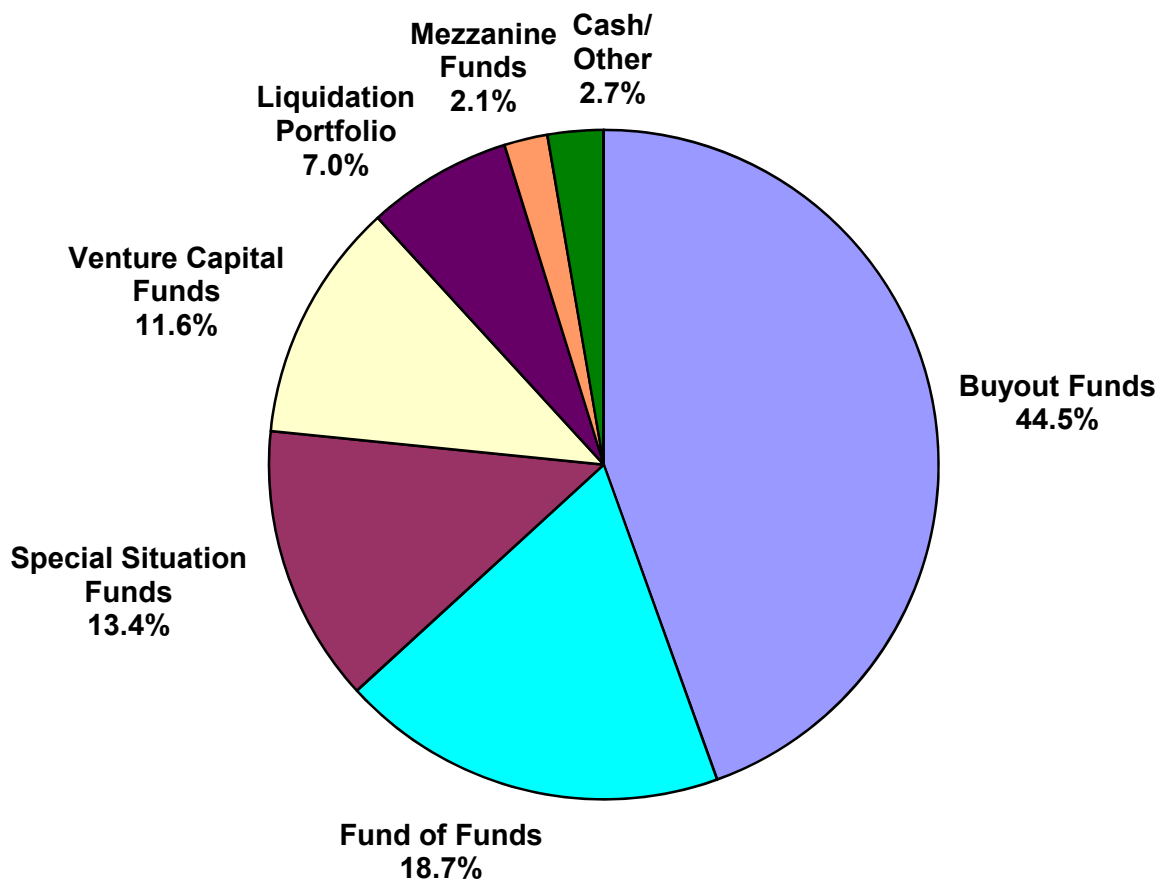
### Strategy Update

The strategy for the next twelve months will focus on new sponsors raising capital and existing sponsors raising successor funds. This may be a combination of buyout, venture capital, secondary, and growth equity funds seeking new commitments. The Private Equity Division continues to tilt slightly toward the middle and lower-middle market to diversify its exposure to large funds. Co-investments continue to play an important role in both averaging down costs and targeting specific investments with attractive risk/return characteristics.

# SMRS

## Private Equity

### 9/30/19



Market Value in Millions				
	9/30/19		9/30/18	
Buyout Funds	\$6,178	44.5%	\$5,300	44.3%
Fund of Funds	2,594	18.7%	1,658	13.8%
Special Situation Funds	1,868	13.4%	1,814	15.2%
Venture Capital Funds	1,607	11.6%	1,380	11.5%
Liquidation Portfolio	972	7.0%	1,189	9.9%
Mezzanine Funds	295	2.1%	210	1.8%
Cash/Other	379	2.7%	420	3.5%
<b>Total</b>	<b>\$13,893</b>	<b>100.0%</b>	<b>\$11,971</b>	<b>100.0%</b>

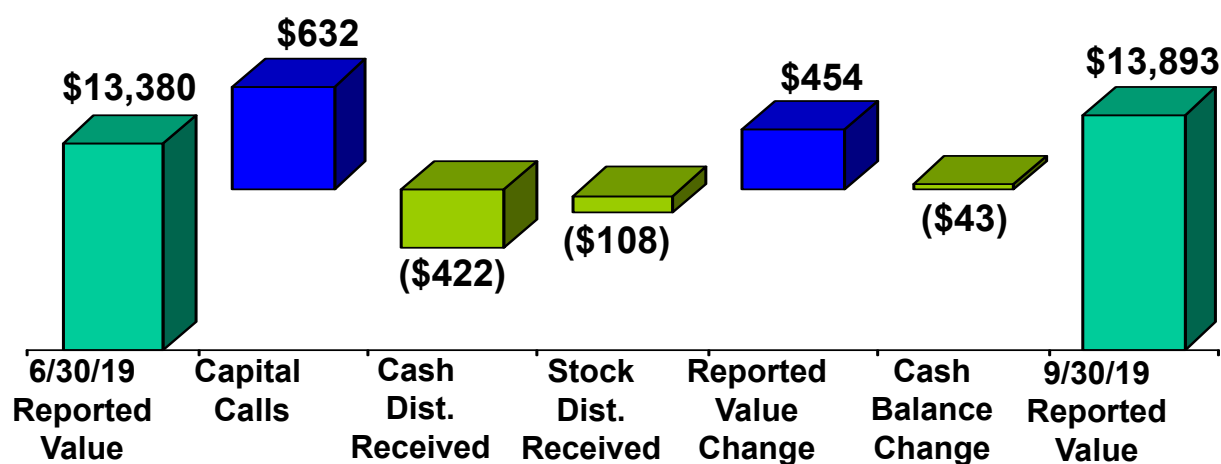
# SMRS

## Private Equity

### 9/30/19

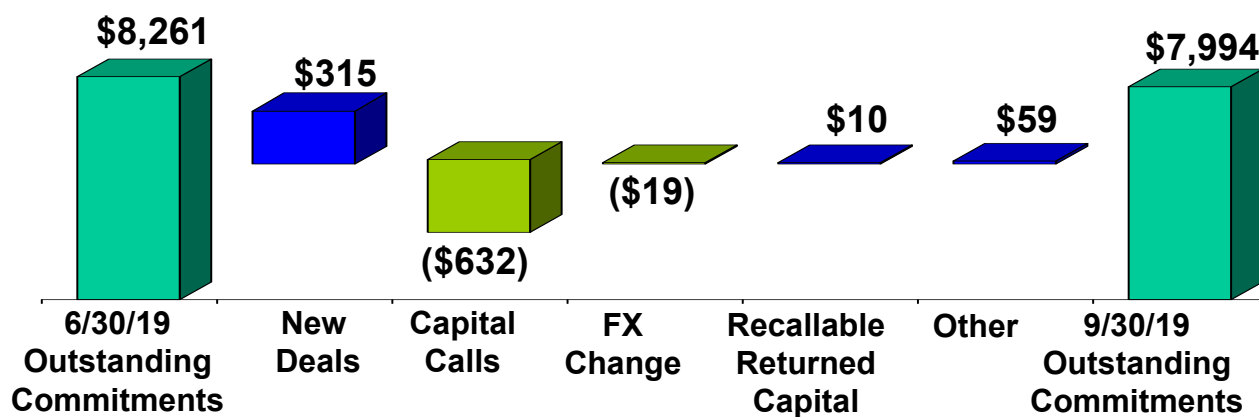
#### Invested Commitments

(\$ in Millions)



#### Outstanding Commitments

(\$ in Millions)

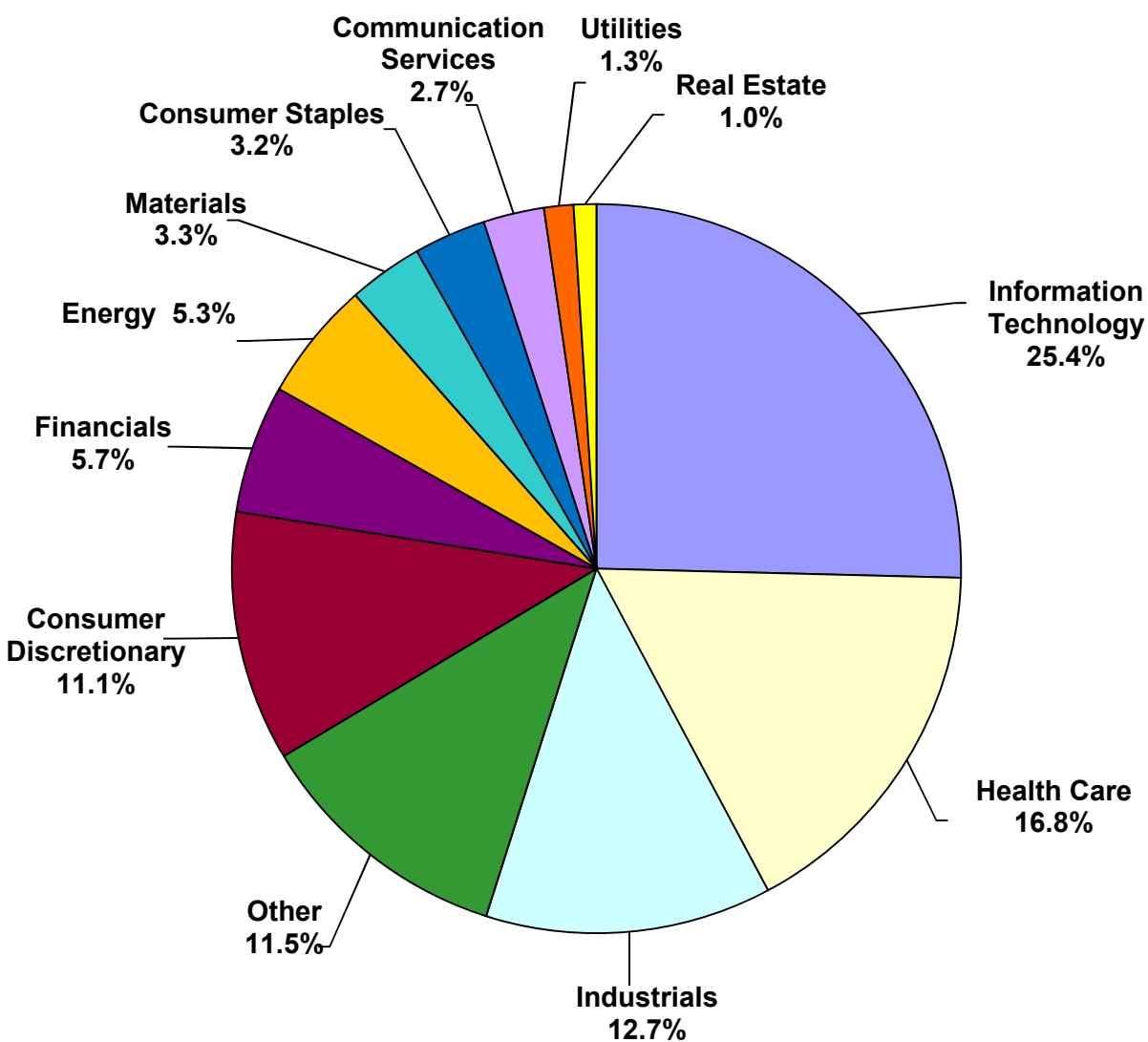


# SMRS

## Private Equity

9/30/19

### Investments by Industry

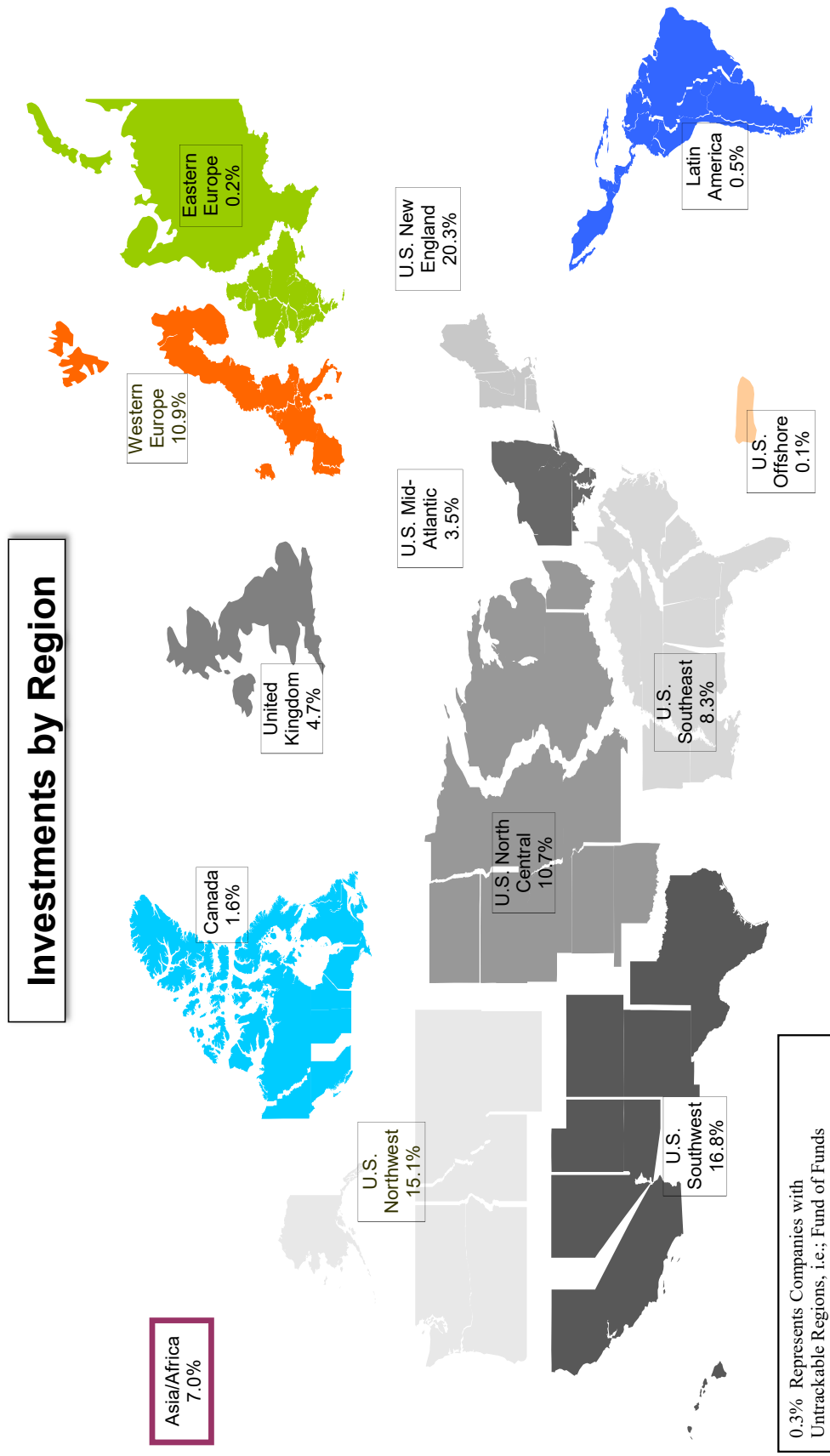


These numbers are based on the most recent available General Partner Data; primarily 6/30/19 and are subject to change.

# SMRS

## Private Equity

9/30/19



Geographic Report: North America 75%, Europe 16%, Asia 7%, Other 2%

# SMRS

## Private Equity

### 9/30/19

#### Portfolio by Vintage Year

(\$ in Millions)

<b>Asset Vintage</b>	<b>Reported Value</b>	<b>Outstanding Commitment</b>	<b>Total Exposure</b>
1986-98	\$ 2	\$ 2	\$ 4
1999	5	5	10
2000	34	21	55
2001	48	30	78
2002	1	3	4
2003	4	8	12
2004	77	35	112
2005	216	23	239
2006*	400	171	571
2007	343	127	470
2008	518	90	608
2009	22	1	23
2010	229	4	233
2011	665	93	758
2012	1,249	86	1,335
2013	377	113	490
2014	1,470	283	1,753
2015	4,846	967	5,813
2016	1,715	753	2,468
2017	642	1,077	1,719
2018	551	2,315	2,866
2019	99	1,787	1,886
Income Accruals	1	0	1
Cash	366	0	366
Act. Small Cap - Stock Dist	13	0	13
<b>Total</b>	<b>\$ 13,893</b>	<b>\$ 7,994</b>	<b>\$ 21,887</b>

\*Liquidation portfolio is 2006 vintage

#### FX Exposure

(\$ in Millions)

	<b>Reported Value</b>	<b>Outstanding Commitment</b>	<b>Total Exposure</b>	<b>Total (USD)</b>
Euro (\$1.09/ €)	€ 390	€ 392	€ 782	\$853

# SMRS

## Private Equity

### 9/30/19

#### Top 10 Sponsors

(\$ in Millions)

<b>Asset Type</b>	<b>Reported Value</b>	<b>Outstanding Commitment</b>	<b>Total</b>
HarbourVest Partners	\$ 3,157	\$ 964	\$ 4,121
Blackstone Capital Partners	533	446	979
Warburg, Pincus Capital	611	296	907
KKR	574	324	898
The Carlyle Group	394	409	803
Advent International	468	309	777
Grosvenor Capital Management	550	105	655
Apax Partners	255	268	523
Leonard Green & Partners, L.P.	413	101	514
Flagship Ventures	374	139	513
<b>Top 10 Total Value</b>	<b>\$ 7,329</b>	<b>\$ 3,361</b>	<b>\$ 10,690</b>

#### Cash Weighted Rates of Return\*

<b>(Net IRR)</b>	<b>Current Qtr.</b>	<b>1-Year</b>	<b>3-Year</b>	<b>5-Year</b>	<b>10-Year</b>
Buyout	-0.4%	8.2%	16.2%	14.1%	16.7%
Fund of Funds	0.0%	9.0%	14.2%	13.1%	12.8%
Mezzanine	0.0%	9.4%	12.1%	8.7%	10.2%
Special Situations	-0.4%	6.2%	11.0%	9.0%	12.3%
Venture Capital	-0.6%	6.6%	16.0%	14.4%	21.8%

\*These numbers are based on most recent available General Partner reported data; primarily 6/30/19 and are subject to change.

# SMRS

## Private Equity

### 9/30/19

#### Net Market Values by Ownership Entity

	Adjusted Reported Value	Unfunded Commitment
5AM Opportunities I, L.P.	\$ 2,996,450	\$ 26,775,000
5AM Ventures VI, L.P.	1,610,919	18,000,000
Accel Europe I, L.P.	3,141,939	1
Accel Europe II	20,892,734	3,300,000
Accel Growth Fund II, L.P.	17,789,043	240,000
Accel Growth Fund III, L.P.	19,622,641	1,120,000
Accel Growth Fund IV L.P.	26,551,914	990,000
Accel Growth Fund V L.P.	6,805,139	21,093,750
Accel IX, L.P.	3,931,050	3,000,000
Accel Leaders Fund II L.P.	1,968,750	7,406,250
Accel Leaders Fund L.P.	11,120,658	0
Accel London V L.P.	17,043,919	2,400,000
Accel London VI, L.P.	750,000	11,750,000
Accel VI-S	2,133,277	652,611
Accel VI, L.P.	873,362	0
Accel VIII, L.P.	246,141	4,782,499
Accel X, L.P.	29,305,246	0
Accel XI, L.P.	13,463,469	1,680,000
Accel XII, L.P.	8,070,844	1,190,000
Accel XIII, L.P.	5,879,784	4,300,000
Accel XIV L.P.	1,379,520	8,550,000
Advent Global Private Equity V	6,215,585	8,700,000
Advent International GPE IX, L.P.	0	250,000,000
Advent International GPE VI-A LP	31,732,463	0
Advent International GPE VII-B, L.P.	163,878,298	12,000,000
Advent International GPE VIII-B, L.P.	239,061,517	29,587,501
Advent Latin American Private Equity Fund VI, L.P.	26,926,275	8,505,000
Affinity Asia Pacific Fund III, L.P.	36,585,178	10,550,074
Affinity Asia Pacific Fund IV, L.P.	106,263,275	20,327,369
Affinity Asia Pacific Fund V L.P.	33,765,564	140,396,722
AIP VII, L.P.	0	75,000,000
Apax Digital, L.P.	12,977,841	38,352,832
Apax Europe Fund VI	18,232,556	2,305,553
Apax Europe VII, L.P.	24,708,148	1,623,723
Apax IX, L.P.	117,492,497	67,376,353
Apax US VII	10,486,060	417,509
Apax VIII - B, L.P.	70,754,633	7,322,257



	Adjusted Reported Value	Unfunded Commitment
<b>** Apax X USD L.P.</b>	<b>0</b>	<b>150,000,000</b>
Apollo Investment Fund IX, L.P.	7,625,608	90,427,643
Apollo Investment Fund VIII L.P.	86,793,436	16,031,253
Arboretum Ventures II	1,022,979	0
Arboretum Ventures III, L.P.	16,594,564	0
Arboretum Ventures IV, L.P.	24,669,376	11,460,000
Arboretum Ventures V, L.P.	191,268	34,720,000
Ares Corporate Opportunities Fund II	2,552,225	11,181,642
Ares Corporate Opportunities Fund III, LP	65,888,335	7,068,718
Ares Corporate Opportunities Fund IV, L.P.	98,847,157	14,992,287
ASF VIII B	968,787	149,985,000
AXA ASF Miller Co-Investment	423,121	6,656,684
Axiom Asia Co-Investment Fund I, L.P.	3,600,761	46,248,591
Axiom Asia IV, L.P.	46,859,661	13,565,886
Axiom Asia Private Capital Fund III, L.P.	48,331,929	6,342,139
Axiom Asia V, L.P.	5,432,901	44,500,000
BC European Capital IX	55,458,085	1,167,152
BC European Capital VII, L.P.	574,786	0
BC European Capital VIII, L.P.	12,001,321	8,499,685
Berkshire Fund IX Coinvestment Fund, L.P.	5,108,335	42,932,166
Berkshire Fund IX, L.P.	80,018,794	88,659,599
Berkshire Fund VI, L.P.	13,713,049	7,600,677
Berkshire Fund VII, L.P.	18,402,750	2,444,220
Berkshire Fund VIII, L.P.	81,754,837	3,583,545
Blackstone Capital Partners IV	4,260,556	4,580,765
Blackstone Capital Partners V	8,902,079	13,069,148
Blackstone Capital Partners V-S	1,059,094	712,476
Blackstone Capital Partners VI, LP	233,404,426	36,775,575
Blackstone Capital Partners VII, L.P.	203,628,006	104,934,995
Blackstone Capital Partners VIII L.P.	0	200,000,000
Bridgepoint Europe IV	29,147,274	5,820,897
Carlyle Europe Partners II	692,382	4,031,500
Carlyle Europe Partners III	10,906,323	4,986,068
Carlyle Europe Partners IV, L.P.	104,286,524	12,182,536
Carlyle Europe Partners V, S.C.SP.	18,690,126	115,564,642
Carlyle Partners IV, L.P.	5,213,285	16,009,296
Carlyle Partners V L.P.	40,513,761	54,261,025
Carlyle Partners VI, L.P.	159,200,422	11,795,808
Carlyle Partners VII, L.P.	54,213,854	189,757,373
Centerbridge Capital Partners III, LP	49,627,286	42,214,332
Cerberus SMRS Partners, L.P.	37,894,368	23,304,657
Charlesbank Equity Fund IX, L.P.	27,671,335	71,097,032
Charlesbank Fund IX Overage Allocation Program	16,250,088	33,799,569
CircleUp Credit Fund I, LP	18,750,475	6,249,525
Clearlake Opportunities Partners II, LP	6,097,367	68,898,616
CM Liquidity Fund, L.P.	0	25,000,000

	<b>Adjusted Reported Value</b>	<b>Unfunded Commitment</b>
Coller International Partners V, L.P.	18,072,659	43,600,000
Coller International Partners VI, L.P.	31,299,970	29,723,267
Coller International Partners VII, L.P.	118,999,549	46,951,976
Crescent Mezzanine Partners VI, L.P.	26,868,873	6,643,012
Crescent Mezzanine Partners VII	57,134,600	92,277,043
CVC Capital Partners VII, L.P.	32,381,620	137,687,478
Dover Street IX, L.P.	70,074,486	30,000,000
Dover Street X, L.P.	0	150,000,000
EnCap Energy Capital Fund X, L.P.	40,036,633	8,306,087
FIMI Opportunity 6, L.P.	20,045,000	30,727,275
FirstMark Capital I, L.P.	89,464,706	196,596
FirstMark Capital IV, L.P.	17,646,869	19,075,000
FirstMark Capital OF I, L.P.	25,800,364	0
FirstMark Capital OF II, L.P.	27,198,806	9,275,000
FirstMark Capital P2, L.P.	168,045,579	0
Flagship Pioneering Special Opportunities Fund II, L.P.	12,369,845	87,000,000
Flagship Pioneering VI	67,732,261	41,625,000
Flagship Ventures Fund 2004	1,209,443	0
Flagship Ventures Fund 2007, L.P.	13,193,491	0
Flagship Ventures Fund IV, L.P.	119,821,908	0
Flagship Ventures Fund V	112,790,935	525,000
Flagship Ventures Opportunities Fund I, L.P.	47,144,553	10,250,000
Fox Paine Capital Fund II, LP	25,467,698	15,382,699
FS Equity Partners VII, L.P.	103,921,717	11,812,822
FS Equity Partners VIII, L.P.	6,469,945	68,069,494
G-IV Acquisition Holdings, LLC	9,121,776	0
GCM Grosvenor Fund Investment Program I, L.P.	6,896,651	1,295,800
GCM Grosvenor Fund Investment Program II, L.P.	21,072,933	13,767,284
GCM Grosvenor Fund Investment Program III - 2004	41,720,807	4,494,827
GCM Grosvenor Fund Investment Program III - 2006	38,521,968	6,870,459
GCM Grosvenor Fund Investment Program V, L.P.	49,668,279	9,668,401
GCM Grosvenor Fund Investment Program VI, L.P.	25,227,454	5,915,077
GCM Grosvenor Fund Investment Program VIII, L.P.	77,484,741	27,161,885
GCM Grosvenor SeasPriFIP LP (PIS06-10)	44,513,944	16,697,797
GCM Grosvenor SeasPriFIP LP (PIS14)	219,685,736	2,488,804
GCM Grosvenor SeasPriFIP LP (Seed)	25,255,307	16,556,088
Genstar Capital Partners IX, L.P.	8,485,123	66,514,877
Genstar Capital Partners VIII, L.P.	60,326,293	1,762,377
Genstar IX Opportunities Fund I, LP	7,331,818	42,668,182
Genstar VIII Opportunities Fund I, L.P.	56,589,760	4,652,691
Green Equity Investors IV	109,254	1,136,036
Green Equity Investors V	118,812,339	25,966,435
Green Equity Investors VI, L.P.	135,163,753	12,751,237
Green Equity Investors VII, L.P.	159,103,925	61,247,859
Greenspring Master G, L.P.	26,145,191	98,750,000
Greenspring Micro II, L.P.	5,128,313	19,716,263

	Adjusted Reported Value	Unfunded Commitment
GSO Capital Opportunities Fund II, L.P.	13,601,503	9,747,276
GSO Capital Opportunities Fund III, L.P.	49,533,834	44,072,960
GSO COF III Co-Investment Fund, L.P.	18,265,557	32,284,583
HarbourVest Credit Opportunities Fund II, LP	0	75,000,000
HarbourVest Dover Street VIII, L.P.	25,656,949	6,075,000
HarbourVest Int'l III Partnership	161,992	1,200,000
Harbourvest Partners Co-Investment Fund IV L.P.	89,768,225	19,107,835
HarbourVest Partners Co-Investment Fund V L.P.	16,862,233	180,000,000
HarbourVest Partners Mezzanine Income Fund	77,739,971	16,310,000
HarbourVest V Partnership	154,439	300,000
HarbourVest VI - Direct Fund LP	3,810,548	750,000
HarbourVest VI Partnership	636,609	2,000,000
Harvest Partners VII, L.P.	66,201,010	13,541,093
Harvest Partners VIII	0	100,000,000
HPS Mezzanine Partners III, L.P.	45,107,182	8,197,255
Insight Venture Partners Growth-Buyout Coinvestment Fund, L.P.	88,077,798	7,578,566
Insight Venture Partners IX, L.P.	183,254,295	2,828,363
Insight Venture Partners X, L.P.	78,042,308	29,000,000
Kelso Investment Associates IX, L.P.	72,339,122	22,630,138
Kelso Investment Associates VII	1,928,751	0
Kelso Investment Associates VIII	32,293,460	22,068,923
Kelso Investment Associates X, L.P.	9,716,206	90,353,422
Khosla Ventures III, L.P.	20,021,927	750,000
Khosla Ventures IV, L.P.	81,101,670	950,000
Khosla Ventures Seed D, L.P.	3,057,985	6,900,000
Khosla Ventures V, L.P.	58,298,422	4,500,000
Khosla Ventures VI, L.P.	24,317,860	50,400,000
KKR 2006 Fund, L.P.	86,137,591	4,959,351
KKR Americas Fund XII, L.P.	93,782,420	110,682,934
KKR Asian	4,675,039	0
KKR Asian Fund II, L.P.	51,067,191	2,346,005
KKR Asian Fund III	56,147,404	56,586,846
KKR China Growth Fund	25,366,226	3,383,656
KKR European Fund II	1,588,745	0
KKR European Fund III	12,197,071	5,745,305
KKR European Fund IV L.P.	129,199,962	7,890,899
KKR European Fund V (USD) SCSp	0	125,000,000
KKR Millennium Fund	256,392	0
KKR North America Fund XI, L.P.	113,830,458	7,525,249
Lead Edge Capital IV, L.P.	20,898,692	7,388,446
<b>** Lightspeed Opportunity Fund, L.P.</b>	<b>0</b>	<b>25,000,000</b>
Lightspeed Venture Partners VII, L.P.	12,286,621	0
Menlo Special Opportunities Fund II, L.P.	3,804,310	26,100,000
Menlo Ventures IX, L.P.	1,492,447	0
Menlo Ventures X, L.P.	22,707,711	0
Menlo Ventures XI, L.P.	49,713,789	0

	Adjusted Reported Value	Unfunded Commitment
Menlo Ventures XIV, L.P.	4,196,544	3,150,000
Meritech Capital Partners III, L.P.	240,532	0
Meritech Capital Partners IV, L.P.	19,655,867	600,000
Meritech Capital Partners V, L.P.	28,341,883	1,450,000
Meritech Capital Partners VI, L.P.	20,703,049	19,600,000
Michigan Growth Capital Partners II, L.P.	156,487,909	5,418,527
Michigan Growth Capital Partners III, L.P.	66,446,414	56,267,883
Michigan Growth Capital Partners, LP	51,496,467	10,940,774
Midtown Fund III, L.P.	0	0
New Leaf Biopharma Opportunities II, L.P.	106,558,722	12,000,000
New Leaf Growth Fund I, L.P.	99,440,477	0
New Leaf Ventures II, L.P.	13,440,569	0
New Leaf Ventures III, L.P.	32,857,976	1,875,000
New Leaf Ventures IV, L.P.	16,012,746	32,750,000
Nordic Capital VI, L.P.	700,928	1
Nordic Capital VII	1,090,852	3,048,907
Nordic Capital VIII, L.P. (Alpha)	40,406,764	6,431,871
Oak Investment Partners X, L.P.	845,684	0
Oak Investments Partners IX, L.P.	268,011	0
Oaktree Opportunities Fund X, L.P.	28,194,952	5,100,000
Oaktree Opportunities Fund Xb, L.P.	8,258,415	61,250,000
OCM Opportunities Fund IX, L.P.	57,562,321	0
OCM Opportunities Fund VII (B), L.P.	1,085,602	5,000,000
OCM Opportunities Fund VII, L.P.	2,449,554	0
OCM Opportunities Fund VIII B, L.P.	14,173,396	0
OCM Opportunities Fund VIII, L.P.	1,965,687	0
OCM Principal Opportunities Fund IV	616,600	5,002,377
Ocqueoc Holdings, LLC	13,912,375	49,182,375
Parthenon Investors II	507,450	3,186,779
Parthenon Investors III	25,041,650	2,682,182
Parthenon Investors IV, L.P.	76,300,231	3,730,111
Peninsula Capital Fund IV	201,867	2,201,026
Peninsula Fund VI, L.P.	33,784,330	6,924,373
Permira Growth Opportunities I, L.P.1	10,341,328	39,880,918
Permira VII L.P. 1	0	81,764,996
PPC Fund II	38,984,109	39,106,692
Public Pension Capital, LLC	58,003,035	52,228,349
Rhone Partners V, L.P.	76,335,046	42,106,223
Riverside Capital Appreciation Fund VI, LP	57,500,241	8,540,248
Riverside Capital Appreciation Fund VII, L.P.	10,298,733	89,701,267
Riverside Micro Cap Fund I, LP	18,275,157	5,782,975
Riverside Micro-Cap Fund II, L.P.	35,387,216	2,735,834
Riverside Micro-Cap Fund III, L.P.	73,639,362	4,823,424
Riverside Micro-Cap Fund IV	55,161,109	3,890,438
<b>** Riverside Micro-Cap Fund IV B, L.P.</b>	<b>0</b>	<b>15,000,000</b>
Riverside Micro-Cap Fund V, L.P.	20,206,556	79,793,444

	Adjusted Reported Value	Unfunded Commitment
Science Ventures Fund II, L.P.	16,308,325	6,600,000
<b>** Science Ventures Fund III, LP</b>	<b>0</b>	<b>25,000,000</b>
Shamrock Capital Content Fund I, L.P.	26,411,349	21,978,538
Shamrock Growth Capital Fund IV, L.P.	20,907,822	27,955,966
Silver Lake Partners II	233,204	3,531,586
Silver Lake Partners III	25,830,368	13,199,137
Silver Lake Partners IV, L.P.	65,551,521	2,615,731
Silver Lake Partners V, L.P.	29,565,283	40,092,691
Silver Lake SL SPV-2	35,075,264	13,847,947
SK Capital Partners V, L.P.	5,648,408	43,879,776
SM/TCP L.P.	35,499,697	1,615,217
SMRS - TOPE LLC	2,156,230,899	235,491,815
SMRS-CAPP LLC	34,017,403	67,300,000
SMRS-NCRP LLC	682,175,260	180,958,521
Summit Partners Growth Equity Fund X, L.P.	0	100,000,000
Sycamore Partners III, L.P.	10,536,065	86,442,202
TCW/Crescent Mezzanine Partners IV, L.P.	219,112	13,660,773
TCW/Crescent Mezzanine Partners IVB Secondary	205,236	0
TCW/Crescent Mezzanine Partners V, LLC	4,529,744	12,395,466
TCW/Crescent Mezzanine Partners VC Secondary	1,473,260	0
The Huron Fund III, L.P.	7,150,123	4,207,756
The Huron Fund IV, L.P.	31,688,733	3,331,960
The Huron Fund V, L.P.	10,203,276	25,952,500
The Shansby Group 5 (TSG5)	1,559,527	4,261,291
Thoma Bravo Discover Fund II, L.P.	24,369,688	49,642,611
Thoma Bravo Fund XII, L.P.	174,546,185	9,537,601
Thoma Bravo Fund XIII, L.P.	44,609,281	79,882,572
TI Platform BOV, L.P.	2,981,330	11,851,796
TI Platform Fund II, L.P.	2,580,855	12,197,888
TI Platform SMRS SMA, L.P.	13,654,385	46,629,548
TPG Healthcare Partners, L.P.	0	25,000,000
TPG IV (Texas Pacific Group IV)	1,461,432	211,725
TPG Partners III, LP	598,392	2,087,002
TPG Partners VI, L.P.	64,212,033	10,258,102
TPG Partners VIII, L.P.	0	125,000,000
TPG Partners, VII, L.P.	143,307,741	25,383,139
TPG V (Texas Pacific Group V)	16,936,236	5,841,509
Trilantic Capital Partners V (North America) Fund A, L.P.	31,240,457	4,188,120
Trilantic Capital Partners VI (North America) L.P.	17,281,329	56,158,666
TSG6, L.P.	112,932,540	23,409,037
TSG7 A L.P.	107,337,284	32,566,986
TSG8, L.P.	2,971,396	147,028,604
Turnbridge Capital Partners I , LP	105,785,587	12,577,405
Veritas Capital Fund V, L.P.	127,538,736	11,358,273
Veritas Capital Fund VI, L.P.	108,401,912	33,759,235
<b>** Veritas Capital Fund VII, LP</b>	<b>0</b>	<b>100,000,000</b>

	<b>Adjusted Reported Value</b>	<b>Unfunded Commitment</b>
Veritas V Co-Investors, L.P.	49,104,113	4,990,000
Vista Equity Endeavor Fund I, L.P.	41,532,695	12,097,349
Vista Equity Endeavor Fund II, LP	4,898,233	60,101,767
Vista Equity Partners Fund V, L.P.	65,292,960	14,555,263
Vista Equity Partners Fund VI, L.P.	90,417,718	12,101,912
Vista Equity Partners VII, L.P.	12,773,510	61,733,218
Vista Foundation Fund III, L.P.	20,062,269	7,192,562
Warburg Pincus China-Southeast Asia II, L.P.	2,625,000	72,375,000
Warburg Pincus China, L.P.	43,217,967	4,477,500
Warburg Pincus Energy MCIP, L.P.	0	10,396,887
Warburg Pincus Energy, L.P.	83,549,416	23,200,000
Warburg Pincus Equity Partners, L.P.	1,159,584	0
Warburg Pincus Financial Sector, L.P.	19,097,376	24,615,000
Warburg Pincus Global Growth, L.P.	8,592,168	140,925,000
Warburg Pincus International Partners	571,527	0
Warburg Pincus Private Equity IX	11,057,319	0
Warburg Pincus Private Equity VIII, L.P.	710,491	0
Warburg Pincus Private Equity X, L.P.	83,968,732	0
Warburg Pincus Private Equity XI, L.P.	165,582,394	0
Warburg Pincus Private Equity XII Secondary, L.P.	23,851,730	2,462,500
Warburg Pincus Private Equity XII, L.P.	167,195,945	17,237,500
WestAm COREplus Private Equity QP	393,697	2,086,719
<b>Total Private Equity</b>	<b>\$ 13,513,357,823</b>	<b>\$ 7,993,755,822</b>
Cash	348,282,011	-
Active Small Cap Cash	17,570,302	-
Active Small Cap	12,746,533	-
Income Accruals	804,482	-
<b>Grand Total</b>	<b>\$ 13,892,761,151</b>	<b>\$ 7,993,755,822</b>

Total Private Equity amounts do not include Cash and Active Small Cap

\*\* New Commitments made during quarter reported

State of Michigan Retirement System

# REAL ESTATE AND INFRASTRUCTURE REVIEW

State of Michigan Investment Board Meeting  
December 19, 2019



Todd A. Warstler  
Senior Investment Manager  
Real Estate and Infrastructure Division

## EXECUTIVE SUMMARY

### Performance

<b>MPSERS Plan (9-30-19)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Annualized Returns	8.0%	9.4%	10.1%	11.2%	8.3%
NCREIF NPI	4.9%	5.4%	7.2%	7.9%	8.4%
Peer Median Returns	7.0%	7.5%	9.2%	10.3%	9.8%
Percentile Rank vs. Peers*	34	28	40	42	73

\*State Street Universe greater than \$1 billion

- Outperformance relative to the one-year benchmark resulted from the Real Estate and Infrastructure Division's (REID) strategy of being underweight in retail, several favorable sale executions in the real estate portfolio, credit strategies, and appreciation and gains in the infrastructure portfolio.

### Strategy Update

- The REID is focusing on sourcing off-market opportunities through its extensive network and reducing risk in the portfolio through early income-generating investments including credit strategies that are higher in the capital stack with a shorter projected hold period. The REID has selectively acquired properties where it can add value through management and leasing and has continued to develop properties at attractive risk-adjusted returns. The REID will continue its strategy of assembling portfolios in both traditional and non-traditional real estate sectors that REID believes will become institutional property types, providing above market appreciation and total returns.
- The REID has been actively managing the portfolio with dispositions in excess of \$1.5 billion, and funding for new or existing investments of nearly \$789 million over the past 12 months. The REID has been a biased seller and is working with its advisors in executing the disposition of properties and realizing gains from the sale of assets at historically low capitalization rates where these opportunities exist.
- The REID has approximately \$1.5 billion in unfunded commitments. New commitments during the quarter include:
  - \$50 million in AEW Senior Housing Investors IV, LP, a closed-end commingled fund specializing in investments in the seniors housing market in the U.S., managed by AEW Senior Housing Investors IV GP, LP.
  - \$100 million in Invesco Strategic Opportunities III, LP, a closed-end commingled fund specializing in opportunistic investments in the U.S. and Europe, across real estate sectors including debt, managed by Invesco Advisers, Inc.

### Market Environment

- Fund flows to the real estate sector recovered in the third quarter after a slow second quarter. Year-to-date capital raised of \$121 billion is on pace to set a new annual record



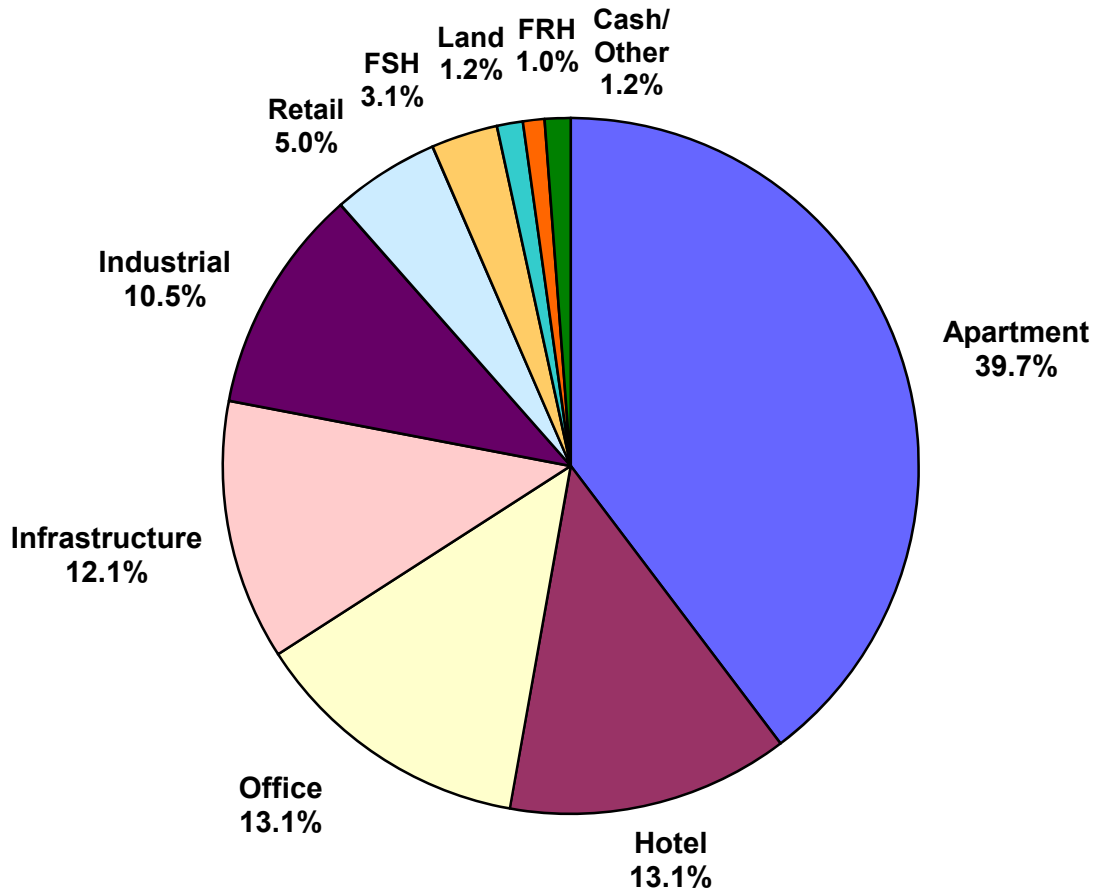
and there is significant dry powder in the system which should continue to act as a support for pricing. Investors are favoring North America with 76% of aggregate capital raised, predominately in the value-added or opportunistic strategies. Retail properties continue to be less attractive to investors as e-commerce sales continue to grow, with investors instead favoring warehouse/logistics (as a retail substitute in some cases) and the apartment sector. Senior housing, student housing, data centers and medical office, once considered niche sectors, are attracting more investor attention. Supply of new buildings in all property types, except retail, has increased in many markets and is beginning to raise concern from investors. However, a strong economy has so far kept demand for space high enough to absorb new supply. Additionally, lenders have become more selective in quality and location of the collateral and have been disciplined in their underwriting standards for construction lending. The cost of new construction in land, labor and materials has steadily increased, making it more difficult for developers to meet return thresholds.

- Capital flows into the infrastructure sector remain strong, as the asset class matures, and investor interest continues to grow. Opportunities include North American energy, power generation, decarbonization efforts, the rising need for data, and emerging market fundamental infrastructure projects. Much of the capital raised in 2018/2019 is in very large fund format and this may impact (lower) returns as there is a limited opportunity set at the largest investment sizes. The REID believes there may be more opportunities for outperformance for regional and/or midsize funds or those with niche strategies. The industry has gained attention from the Federal Administration's intent on rebuilding U.S. infrastructure; however, details on legal and financial framework of Public Private Partnerships (P3) are limited and will take time to develop. A tight labor market for construction workers, rising wage and materials cost, budget considerations and political gridlock in Washington could inhibit timing of funding and completions.
- Tightening lending standards combined with heightened bank regulations after the global financial crisis have worked to constrain lending activity in many instances. Demand for private credit from non-traditional capital providers, particularly when a financial sponsor requires speed and certainty of execution, is expected to continue to grow. Real estate credit in the U.S., Europe and Asia in various forms should continue to present opportunities.

# SMRS

## Real Estate and Infrastructure

### 9/30/19



Market Value in Millions				
	9/30/19		9/30/18	
Apartment	\$2,820	39.7%	\$3,287	42.8%
Hotel	933	13.1%	956	12.4%
Office	930	13.1%	857	11.2%
Infrastructure	863	12.1%	816	10.6%
Industrial	749	10.5%	607	7.9%
Retail	355	5.0%	339	4.4%
For Sale Homes (FSH)	219	3.1%	288	3.7%
Land	87	1.2%	108	1.4%
For Rent Homes (FRH)	73	1.0%	317	4.1%
	<u>\$7,029</u>	<u>98.8%</u>	<u>\$7,575</u>	<u>98.5%</u>
Cash/Other	84	1.2%	113	1.5%
<b>Total Investments</b>	<b><u>\$7,113</u></b>	<b><u>100.0%</u></b>	<b><u>\$7,688</u></b>	<b><u>100.0%</u></b>

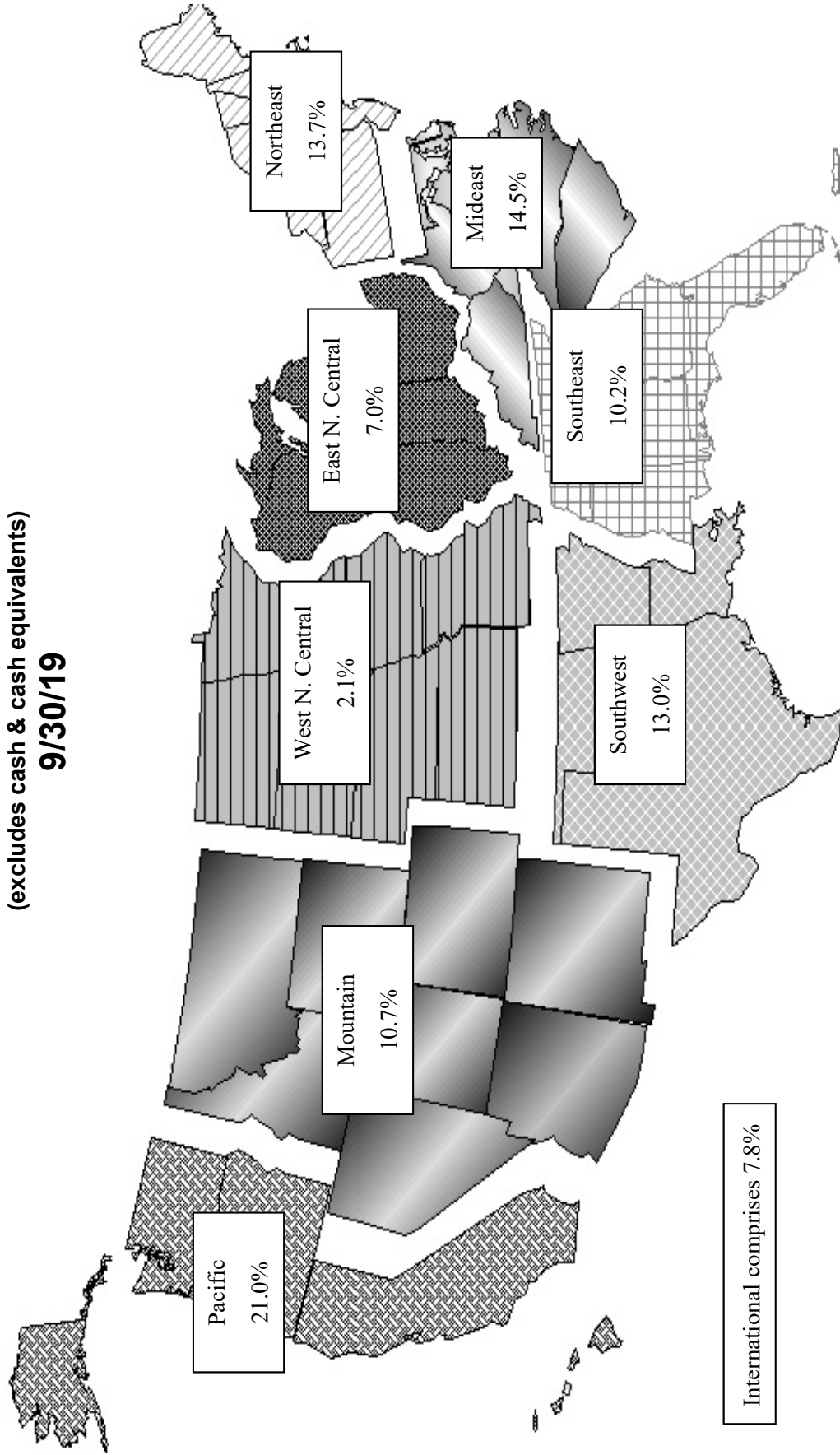
# SMRS

## Real Estate by Region

### Based on Market Value

(excludes cash & cash equivalents)

9/30/19



Geographic regions defined by NCREIF, whose property index composition is: Pacific 32.6%, Mountain 6.5%, West N. Central 1.3%, Southwest 10.4%, East N. Central 7.1%, Southeast 9.8%, Northeast 20.5%, Mideast 11.8%

**SMRS**  
**Real Estate and Infrastructure**  
**9/30/19**

**Top Ten  
Advisors or Entity**

<u><b>Advisor or Entity</b></u>	(\$ in millions) <u><b>Market Value</b></u>
MWT Holdings LLC	\$ 2,251
Clarion Partners	693
Principal Real Estate Investors	432
Five Star Realty Partners LLC	343
Blackstone Group	306
Domain Capital Advisors Inc	293
Rialto Capital Management LLC	274
CIM Investment Advisors LLC	234
Transwestern Investment Management	180
Grosvenor Capital Management	166
	<u>\$ 5,172</u>

**Occupancy  
by Property Type**

	<b>Apartment</b>	<b>Office</b>	<b>Industrial</b>	<b>Retail</b>	<b>Hotel</b>
SMRS Portfolio	94.3%	81.9%	96.2%	92.6%	76.0%
National Average	93.2%	87.8%	92.9%	95.5%	70.0%

**SMRS**  
**Market Values by Ownership Entity**  
**9/30/19**  
**REAL ESTATE**

	<b>Market Value</b>	<b>Unfunded Commitment</b>
801 Grand Avenue Capital, LLC	\$ 70,139,768	\$ 0
AEW Senior Housing III	4,033,882	715,013
* <b>AEW Senior Housing Investors IV, LP</b>	3,652,462	46,292,613
Apollo Asia Real Estate Fund	25,185,173	51,116,044
Asana Partners Fund I	25,917,994	5,416,828
Asana Partners Fund II, LP	1,312,500	48,467,904
Avanath Affordable Housing II, LLC	31,210,988	0
Avanath II SMRS Co-Investment Fund LLC	14,258,514	0
Avanath Affordable Housing III	44,288,380	5,496,830
Blackstone R/E IH3 Co-Inv Partners	62,495,733	0
Blackstone R/E Partners V, LP	4,191,874	0
Blackstone R/E Partners VI, LP	6,649,078	3,680,930
Blackstone R/E Partners VIII, LP	72,573,298	17,225,600
Blackstone R/E Partners IX, LP	13,990,538	186,009,462
Capri Select Income II	52,195	0
Capri Urban Investors, LLC	8,275,189	0
CIM Commercial Trust Corp	9,109,567	0
CIM Fund III, LP	39,558,708	0
CIM Fund VIII, L.P.	115,214,299	1,487,563
CIM VI (Urban REIT), LLC	31,541,628	0
Clarion Gables Multifamily Trust, LP	32,174,912	0
Columbus Circle Holdings, LLC	185,762,040	130,246,764
Crown Small Cap Real Estate	17,178,963	8,375,000
Domain GVA-1, LLC	38,586,416	3,034,447
Domain Hotel Properties, LLC	423,615,082	0
Gateway Capital Real Estate Fund II, LP	5,959,429	0
Great Lakes Property Group Trust	42,581,595	9,565,475
Heitman Credit	50,795,631	0
IDR Core Property Index Fund, LLC	23,636,148	1,861,148
India Property Fund II, LLC	23,399,520	2,212,118
Invesco Mortgage Recovery Feeder Fund	3,807,268	0
Invesco Mortgage Recovery Fund II, L.P.	25,596,405	34,249,727
* <b>Invesco Strategic Opportunities III, L.P.</b>	24,055,427	75,944,573
IPF II Co-Invest Cayman LP	23,930,572	1,720,897
JBC Funds North LaSalle LLC	19,073,977	0
JBC Opportunity Fund III, LP	495,673	0
KBS/SM Fund III, LP	49,509,644	0
KBS/SM Fund IV	171,481	0
L-A Saturn Acquisition	33,109,969	0
Landmark Real Estate Partners V, LP	8,408,243	0
LaSalle Asia Opportunity Fund II, LP	281,574	0
LaSalle Asia Opportunity Fund III, LP	1,223,736	0

	<b>Market Value</b>	<b>Unfunded Commitment</b>
Lion Industrial Trust	\$ 232,550,145	\$ 0
Lion Mexico Fund, LP	5,286,533	0
Lombard GVA0016	343,755,160	0
Lone Star Fund X LP	146,374,578	51,236,605
Lone Star Fund XI LP	10,728,751	189,271,249
Lubert-Adler Real Estate Fund VII, LP	64,267,370	6,538,662
M1 Westgate ColInvest LLC	19,079,980	0
M301W ColInvest LLC	20,325,147	0
MERS Acquisitions Ltd.	161,105,988	24,344,500
MG Alliance, LLC	50,994	0
MIP Holdco LLC	138,597,954	14,624,156
MSREF V - International	2,330,089	0
MSREF VI - International	4,758,744	0
MSRESS Fund III Institutional LP	19,669,270	0
MWT Holdings, LLC	2,251,654,786	0
Northpark Land Associates	34,124,104	8,926,967
Orange Investors LLC	1,174,167	0
Paladin Realty Brazil Investors III (USA), LP	17,067,450	0
Paladin Realty Latin America Investors IV-CI, LP	42,825,655	0
Paladin Realty TB COINV V LP	12,020,235	0
Penmain Office LLC	35,057,348	0
Principal Separate Account	362,243,314	124,701,754
Proprium RE Spec. Situations Fund, LP	60,824,485	24,518,082
Rialto Absolute Partnership I	75,252,284	0
Rialto Credit Partshp LP	64,629,586	1,374,858
Rialto Real Estate Fund, LP	21,003,637	0
Rialto Real Estate Fund II, LP	36,943,672	0
Rialto Real Estate Fund III-Debt, LP	44,230,171	4,709,788
Rialto Real Estate Fund III-Property, LP	29,355,185	21,095,891
Rialto Mezzanine Partners Fund	2,749,269	0
SM Brell II LP	28,175,029	0
Stockbridge RE Fund II-C, LP	25,790,767	0
Strategic LP	1,244,218	0
Strategic II LLC	21,936,395	41,325,728
TPG RE Finance Trust Inc.	95,712,961	0
TPG Real Estate Partners II	28,631,114	13,868,052
TPG Real Estate Partners III, LP	737,523	49,262,477
TSP Spartan C-I LLC	16,999	0
TSP Spartan C-II LLC	19,117,804	0
TSP Value and Income Fund II, LP	23,006,247	27,868,628
True North High Yield Invest. Fund II, LLC	3,267,329	0
True North Real Estate Fund III, LLC	40,429,283	11,283,407
Venture Center, LLC	16,140	0
	\$ 6,165,123,334	\$ 1,248,069,740
Short-Term Investments and Other	68,884,448	0
<b>Total Real Estate Investments</b>	<b>\$ 6,234,007,782</b>	<b>\$ 1,248,069,740</b>

\* New or additional commitment made during the quarter reported

**SMRS**  
**Market Values by Ownership Entity**  
**9/30/19**

**INFRASTRUCTURE**

	<b>Market Value</b>	<b>Unfunded Commitment</b>
Arclight Energy Partners VI, LP	\$ 47,075,764	\$ 6,953,820
ASF VI Infrastructure B LP	22,299,608	10,109,497
ASF VII Infrastructure Fund B L.P.	10,905,037	18,546,932
ASF Como Co-Investment LP	8,093,418	2,405,051
Basalt Infrastructure Partners, LP	44,986,686	2,219,045
Blackstone Energy Partners, LP	40,604,837	4,728,291
Blackstone Energy Partners II, LP	74,592,248	23,154,571
Brookfield Infrastructure Fund II-B, L.P.	54,862,010	5,353,675
Customized Infrastructure Strategies, LP	39,681,155	4,733,431
Dalmore Capital Fund	64,234,985	0
GCM Grosvenor Infrastructure Investment Program, L.P.	79,329,312	0
GCM Grosvenor Customized Infrastructure Strategies II, L.P.	47,830,434	15,410,709
Global E&P Infrastructure Fund II L.P.	59,672,929	9,349,664
GSO Energy Select Opportunities Fund LP	29,155,614	25,258,053
GSO Energy Select Opportunities Fund II, LP	2,635,425	47,484,745
JPMorgan AIRRO India SideCar Fund US, LLC	84,960,225	3,187,421
JPMorgan AIRRO Fund II	11,635,531	7,440,094
KKR Eagle CoInvest L.P.	35,990,304	1,853,268
KKR Global Infrastructure Investors, LP	38,950,708	4,182,224
Ridgewood Water & Strategic Infrastructure Fund LP	8,457,618	45,137,013
RPEP SMRS Infra II, LLC	6,299,650	500,000
StonePeak Infrastructure Fund LP	51,116,401	10,696,894
	<b>\$ 863,369,899</b>	<b>\$ 248,704,398</b>
Short-Term Investments and Other	15,403,083	0
<b>Total Infrastructure Investments</b>	<b>\$ 878,772,982</b>	<b>\$ 248,704,398</b>
 <b>TOTAL INVESTMENTS</b>	 <b>\$ 7,112,780,764</b>	 <b>\$ 1,496,774,138</b>

\* New or additional commitment made during the quarter reported

State of Michigan Retirement System

# REAL & OPPORTUNISTIC RETURN

State of Michigan Investment Board Meeting  
December 19, 2019



Jennifer Yeung  
Senior Investment Manager  
Real & Opportunistic Division



## EXECUTIVE SUMMARY

### Performance

<b>MPSERS Plan (9/30/19)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Real & Opportunistic	10.5%	12.4%	9.9%	11.4%	N/A
Custom Benchmark	6.5%	7.3%	7.1%	7.1%	N/A

- The portfolio value is \$8.1 billion with a one-year return of 10.5%. Performance for the year was driven by current income from credit investments, natural resource production-linked and lending strategies and music royalties, as well as capital appreciation of media and entertainment assets.

### Strategy Update

- The objective of the Real Return & Opportunistic portfolio is to provide an inflation hedge and/or to gain exposure to attractive opportunities that may not fit in another plan portfolio.
- The Real Return & Opportunistic portfolio has approximately \$3.9 billion of unfunded commitments. Five new commitments closed during the quarter.
  - \$250 million to Blackstone Strategic Capital Holdings II L.P, a comingled fund that invests in minority stakes of asset management firms.
  - \$100 million to Blackstone Strategic Capital Holdings II L.P. - Co-investment, a separately managed account allowing SMRS to invest in select opportunities alongside the fund.
  - \$100 million to AG Credit Solutions Fund L.P, a credit fund that seeks to provide financing solutions to firms across public and private credit markets that are facing stressed or distressed situations.
  - \$75 million to Orion Mine Finance Fund III L.P, a comingled fund strategy that seeks to provide comprehensive capital solutions for the construction of mid-to-late stage mine projects.
  - \$75 million to Turning Rock Fund I L.P, an opportunistic credit fund focused on providing capital to North American lower middle market privately held businesses.
- We remain focused on finding differentiated strategies that are additive to the current portfolio mix.
  - We continue to like private credit opportunities, niche strategies with some scalability, and contractual cash flow. Specifically, we like opportunities that have defensible cash flows and offer structural downside protection. We continue to be selective and favor investment teams that are disciplined and have experience investing over multiple cycles.

# SMRS

## Real Return and Opportunistic

### 9/30/19

### Top Ten Advisors or Entities

(\$ in Millions)

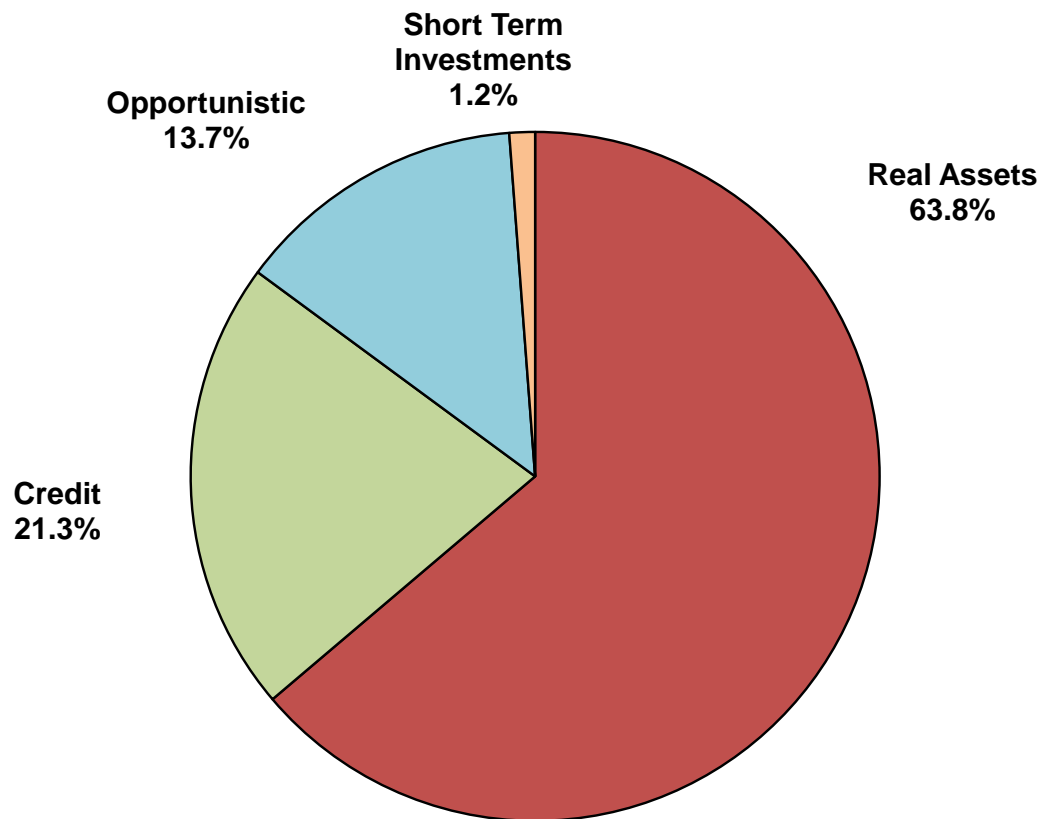
<u>Advisor or Entity</u>	<u>Market Value</u>
Barings Alternative Investments	\$ 2,656
Apollo Global Management	1,107
Domain Capital Advisors	794
ICG Advisors	459
Kayne Anderson Capital Partners	325
TPG Sixth Street Partners	301
Fortress Investment Group	245
Orion Resource Partners	233
Ridgewood Energy	221
Czech Management	197
<b>Total Market Value</b>	<b>\$ 6,538</b>

# SMRS

## Real Return and Opportunistic

9/30/19

### Investments By Strategy

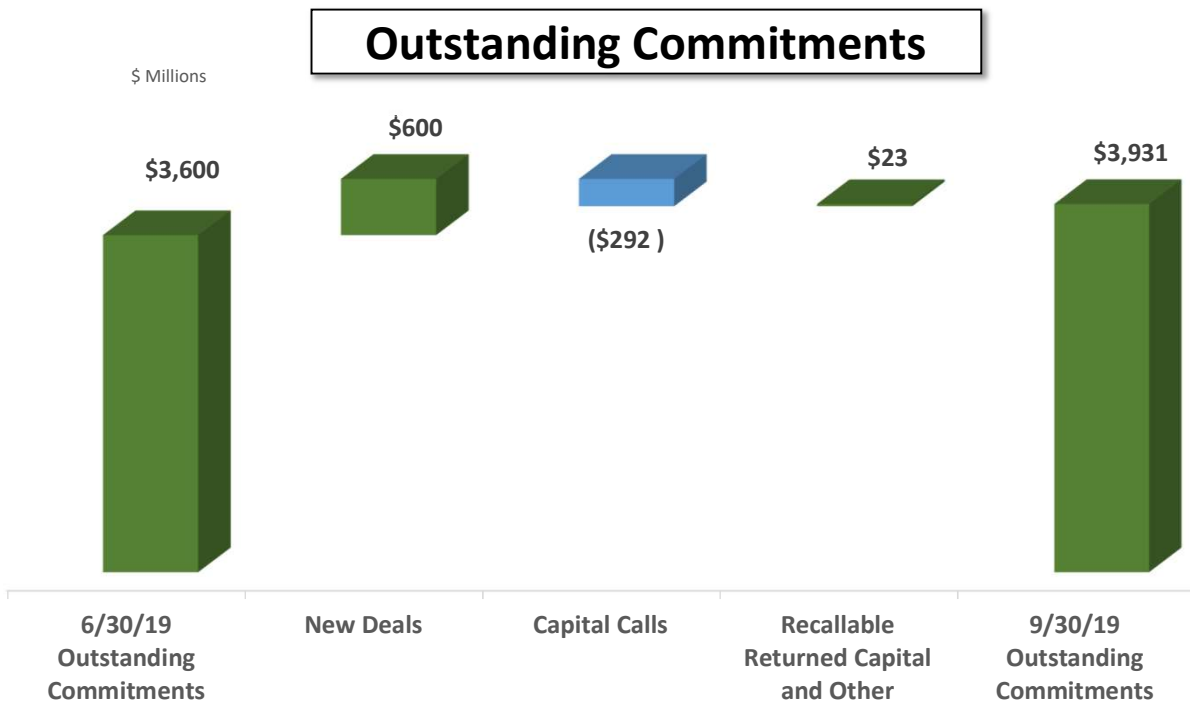
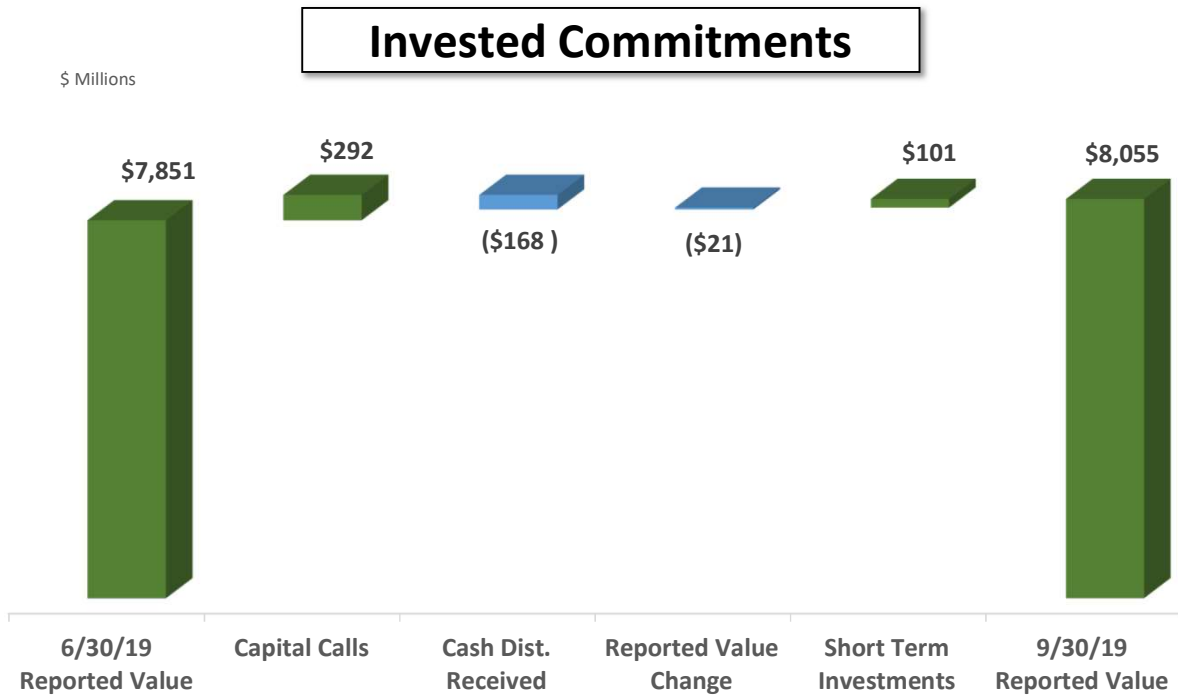


Market Value in Millions	
	9/30/19
Real Assets	\$5,136
Credit	1,716
Opportunistic	1,103
Short Term Investments	100
<b>Total Investments</b>	<b>\$8,055</b>

# SMRS

## Real Return and Opportunistic

### 9/30/19



# SMRS

## Real Return and Opportunistic

### 9/30/19

#### Net Market Value by Entity

	Net Market Value	Unfunded Commitment
* Abernathy	\$ 271,532,093	\$ 40,287,356
Altus Midstream	9,905,000	0
** <b>Angelo Gordon Credit Solutions Fund</b>	<b>0</b>	<b>100,000,000</b>
Apollo European Principal Finance Fund II	16,653,518	8,168,753
Apollo HK TMS Investments Holdings LP	5,806,384	0
Apollo Offshore Credit Fund	28,254,677	0
Axton Holdings	1,818,527,221	0
Barings Asset Based Income Fund I	139,637,073	176,097,137
Barings Global Real Asset Fund I	57,470,004	228,856
Blackstone Strategic Capital Holdings, LP	60,935,462	69,590,133
Blue Peninsula Fund LP	134,453,054	62,472,577
Broadriver III	31,786,105	168,425,507
BSCH Parallel (MLG) I LP	110,110,798	38,874,114
** <b>BSCH II</b>	<b>0</b>	250,000,000
** <b>BSCH II Co-Invest</b>	<b>0</b>	100,000,000
Carlyle Energy Mezzanine Opportunity Fund II	24,001,363	23,543,234
Carlyle IEP Co-Invest (Varo)	16,431,543	865,260
Carlyle International Energy Partners	52,881,691	25,473,718
Carlyle International Energy Partners II	0	150,000,000
Castle Credit SMRS Holdings LLC	44,063,698	146,783,562
Centerbridge SCP III	20,654,058	12,532,213
Content Holdings, LLC	383,508,547	56,191,385
Credit Opportunity Fund III	26,105,123	20,486,976
EleganTree Fund SPC	0	3,079
Energy Recap and Restructuring	25,987,805	7,085,025
ERR MI Holdings LP	3,519,704	2,269,933
Fairfield	10,440,444	81,078,084
FCO MA MI LP	170,285,683	36,730,025
Financial Credit Investment II	247,159,344	184,797,353
Financial Credit Investment III	225,944,437	151,341,773
Flywheel Energy Co-Invest	27,990,057	7,000,000
Fortress Transportation & Infrastructure	57,220,383	0
Greatrock LLC	19,852,192	0
Global Maritime	76,271,917	3,414,854
GSO Credit Alpha Fund	41,328,195	37,910,063
Hopen Life Science Fund II	4,025,605	715,000
HPS Red Cedar Fund	179,978,185	113,744,281
Kayne Anderson Energy Fund VII, LP	58,157,476	19,068,705
Kayne Anderson Private Energy Income Fund	128,733,859	24,420,649
Kayne Anderson Private Energy Income Fund II	25,196,680	123,150,000
Kayne Solutions Fund	54,180,384	193,862,715
KKR Energy Income & Growth Fund	48,709,523	1,953,202
KKR Lending Partners	11,422,177	11,930,723
KKR Lending Partners II	33,392,496	11,737,239
Lakewater	112,824,814	767,870

	Net Market Value	Unfunded Commitment
Lakewater II	75,417,952	10,411,430
Lakewater III	287,553,910	1,538,559
Lakewater IV	31,896,143	2,196,174
Lakewater V	113,176,549	3,729,801
Marathon CLO Equity Fund	16,507,482	7,029,470
Merit Energy Partners I LP	34,751,325	0
MidCap Finco Holdings LTD	304,336,345	1,453,424
Mortgage Servicing Rights	74,963,742	0
Napier Park Aircraft Leasing Vehicle I, LLC	46,124,943	16,259,554
Napier Park AL Rollover Fund I	13,789,423	66,250,877
Nash Co-Investment	15,505,768	68,476
New Fortress Energy HLDGS	414,958,333	0
New Fortress Energy LLC	7,808,901	0
NGP Natural Resources XII	45,620,653	102,073,327
Orion Co-Investments III, LP	5,982,778	2,236,552
Orion Mine Finance	67,930,365	2,982,344
Orion Mine Finance 1A	39,783,844	2,900,007
Orion Mine Finance Co-Fund II LP	19,205,688	29,917,874
Orion Mine Finance II	89,436,242	14,680,077
<b>** Orion Mine Finance III LP</b>	<b>10,283,934</b>	<b>64,224,980</b>
Redding Ridge Holdings, LP	66,014,217	37,443,359
* Ren Venture Fund II	27,499,528	2,500,000
* Ren Venture Fund III	6,128,988	20,276,880
Ridgewood Energy Oil & Gas II	90,590,604	16,483,909
Ridgewood Energy Oil & Gas III	83,524,124	172,173,371
Ridgewood Fund II Co-Invest (REOG)	25,992,709	5,299,424
Riverside Credit Solutions FD I LP	17,463,658	34,319,935
RPEP Energy Opportunistic Institutional Partners	21,321,750	15,561,115
SJC Direct Lending Fund	873,607	15,088,120
SJC Direct Lending Fund IA	182,429	3,764,486
SJC Direct Lending Fund II	6,303,593	38,261,315
SJC Direct Lending Fund III	169,389,119	45,685,148
SJC Direct Lending Fund III Co-Invest G-III	20,000,000	0
* Social Network Holdings	128,525,531	5,590,289
Specialty Equity Strategy LP	267,077	19,647,000
Specialty Loan Fund III	13,096,100	6,135,565
Sprott Private Resource Lending (US), LP	32,923,079	54,788,628
Sprott PRL(M) LP	2,792,973	1,533,019
Sprott PRL(M-Co-Invest) LP	7,460,132	17,687,500
Structured Credit Recovery Fund IV	187,022,243	59,115,789
Terra Co-Investment	30,477,151	14,000,000
TICP CLO Partners II	47,696,557	1,231,939
TSSP Adjacent Opportunities Partners	176,566,224	135,798,065
TSSP Capital Solutions	62,660,310	238,438,469
TSSP Opportunities Partners IV	14,421,884	87,532,573
<b>** Turning Rock Fund I, LP</b>	<b>0</b>	<b>75,000,000</b>
Vida Insurance Credit Opportunity Fund II	95,214,018	6,181,404
Warwick (SMRS) Co-Invest, L.P.	35,060,015	2,732,720
Warwick Partners III	55,274,333	7,454,932
<b>Total Real Return and Opportunistic</b>	<b>\$ 7,955,115,045</b>	<b>\$ 3,930,679,233</b>
Short-Term Investments & Other	100,024,922	0
<b>Grand Total</b>	<b>\$ 8,055,139,967</b>	<b>\$ 3,930,679,233</b>

\* Fund of Funds

**\*\* New Commitment**

State of Michigan Retirement System

# ABSOLUTE RETURN REVIEW

State of Michigan Investment Board Meeting  
December 19, 2019



Daniel J. Quigley  
Senior Investment Manager  
Absolute Return Strategy

## EXECUTIVE SUMMARY

### Performance

<b>MPSERS Plan (9/30/19)</b>	<b>1-Year</b>	<b>3-Years</b>	<b>5-Years</b>	<b>7-Years</b>	<b>10-Years</b>
Absolute Return	4.1%	6.0%	3.7%	5.4%	5.3%
HFRI FOF Conservative	1.6%	3.3%	2.1%	3.3%	2.9%

- The value of the Absolute Return portfolio is \$4.1 billion with a one-year return of 4.1%. Manager selection and exposure to multi-strategy, event-driven and diversifying strategies contributed to positive third quarter performance. There were no strategy level detractors during the quarter.
- With a backdrop of continued volatility across asset classes, Multi-Strategy/Event managers were the biggest contributor to performance during the quarter. Event-driven managers had a strong quarter driven by positive performance of underlying alternative asset managers and a few activist equity positions. In Special Situations focused investments, performance came from mortgage related investments in mortgage servicing rights.
- Diversifying strategies were the second largest contributor to performance for the quarter, where managers were able to generate positive returns from a long duration bias, particularly in the front-end and belly of the curve in both the US and Europe. Managers generated other gains in gold, SPX 500, and various risk-off FX positions.

### Strategy Update

- The objective of the Absolute Return portfolio is to diversify the total plans' holdings, targeting returns above investment-grade fixed income with lower volatility than the equity portfolio. The portfolio utilizes a diverse mix of managers that invest both long and short to target specific exposures and seek to hedge out unwanted risk.
- No new commitments for the quarter.
- In terms of allocation priorities, we continue to be focused on high quality diversifiers and targeted opportunities in niche credit. Due to lower alpha expectations, we are continuing to reduce our exposure to fundamental equity strategies. We have slightly increased our exposure to multi-strategy, macro and emerging markets managers.

Overall, we will continue to focus on opportunities that seek to provide diversification, protect the downside and deliver absolute return.



# SMRS

## Absolute Return

### 9/30/19

#### Net Market Values by Entity

	<u>Net Market Value</u>
* Tahquamenon Fund, LP	\$ 3,602,293,704
Drawbridge Opportunities Fund	257,281,524
JM IV, LP	86,139,948
MP Securitized Credit Master Fund, LP	66,703,717
SJC Direct Lending Revolver Fund III, LP	62,407,578
* EnTrust White Pine Partners, LP	14,910,408
Visium Balanced Fund, LP	299,801
<b>Total Absolute Return</b>	<b>\$ 4,090,036,679</b>
Short-Term Investments & Other	35,046,601
<b>Grand Total</b>	<b>\$ 4,125,083,280</b>

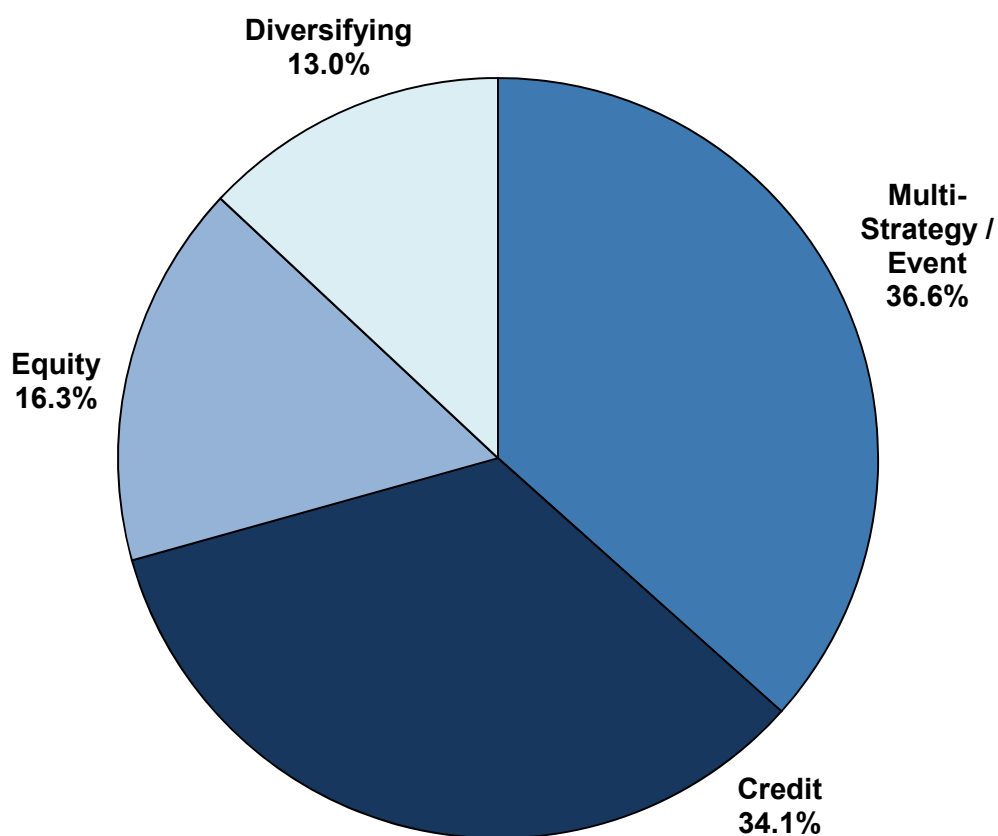
\* Fund of Funds

# SMRS

## Absolute Return

9/30/19

### Investments By Strategy



Strategy Breakdown			
Underlying Funds:	69	Median Position Size:	0.5%
Strategies:	4	Average Position Size:	1.4%
Relationships:	7	Largest Position Size:	6.8%

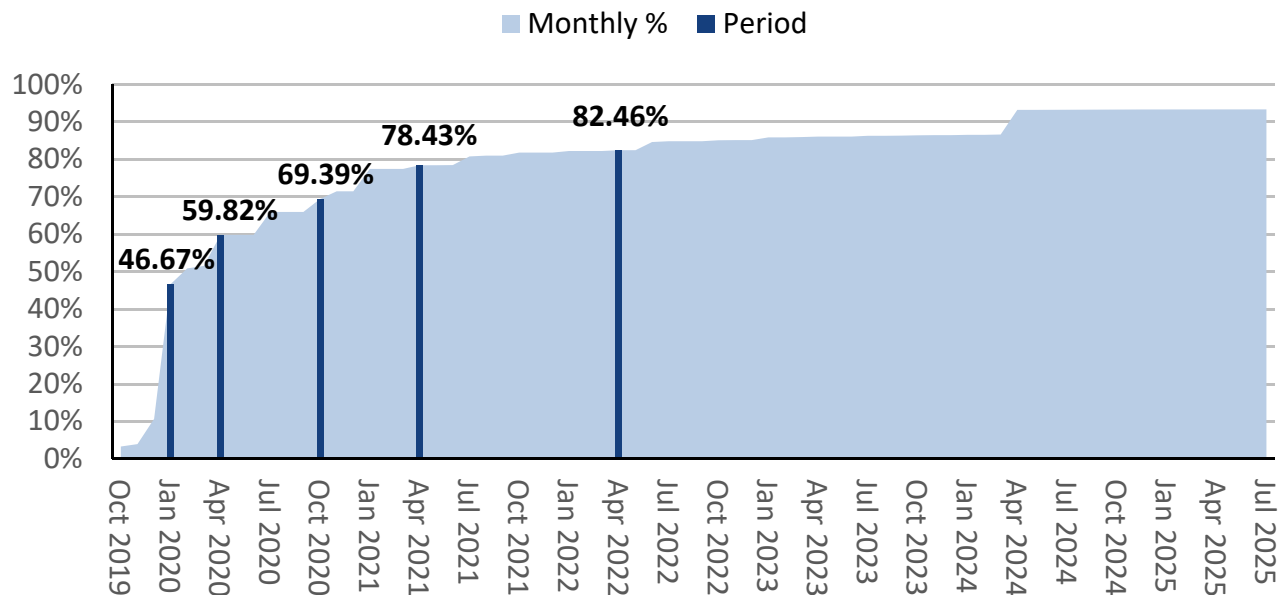
# SMRS

## Absolute Return

### 9/30/19

## Liquidity Analysis

Redeemable	Marginal Allocation (% each period)	Aggregate Allocation (% since Analysis Date)
By 1/1/20	46.67%	46.67%
By 4/1/20	13.15%	59.82%
By 10/1/20	9.57%	69.39%
By 4/1/21	9.04%	78.43%
By 4/1/22	4.03%	82.46%
After 4/1/22	10.93%	93.39%
Illiquid	6.61%	100.00%
<b>Total</b>	<b>100.00%</b>	<b>N/A</b>



State of Michigan Retirement System

# BASKET CLAUSE REVIEW

State of Michigan Investment Board Meeting  
December 19, 2019



Karen M. Stout, CPA, CGFM  
Administrator  
Trust Accounting Division

# SMRS

## Basket Clause Investments

### 9/30/19

<b>Asset Class</b>	<b>Value</b>
Total Absolute Return	\$ 4,090,036,679
Total Real Return and Opportunistic	713,762,767
Total International Equity	75,052,641
Total Fixed Income	<u>66,544,913</u>
<b>Total Basket Clause Investments</b>	<b><u>\$ 4,945,397,000</u></b>

The basket clause investments at September 30, 2019, were \$4.9 billion or 6.6% of the total portfolio value of \$74.8 billion.

The Public Employees Retirement System Investment Act, 1965, PA 314, MCL 38.1132 *et seq*, authorizes the State Treasurer to invest up to 30% of the system's assets in investments "not otherwise qualified under the act." MCL 38.1140d (1). Commonly referred to as Section 20d (after the authorizing section of PA 314) or Basket Clause investments, this provision gives the State Treasurer the flexibility to take advantage of market opportunities not specifically authorized in PA 314 while conserving protections against imprudent investment.

# Disclaimer



**This presentation was given solely for the purpose of explaining the structure, investment process, and returns for the State of Michigan Retirement System. It should not be interpreted in any way as financial advice.**